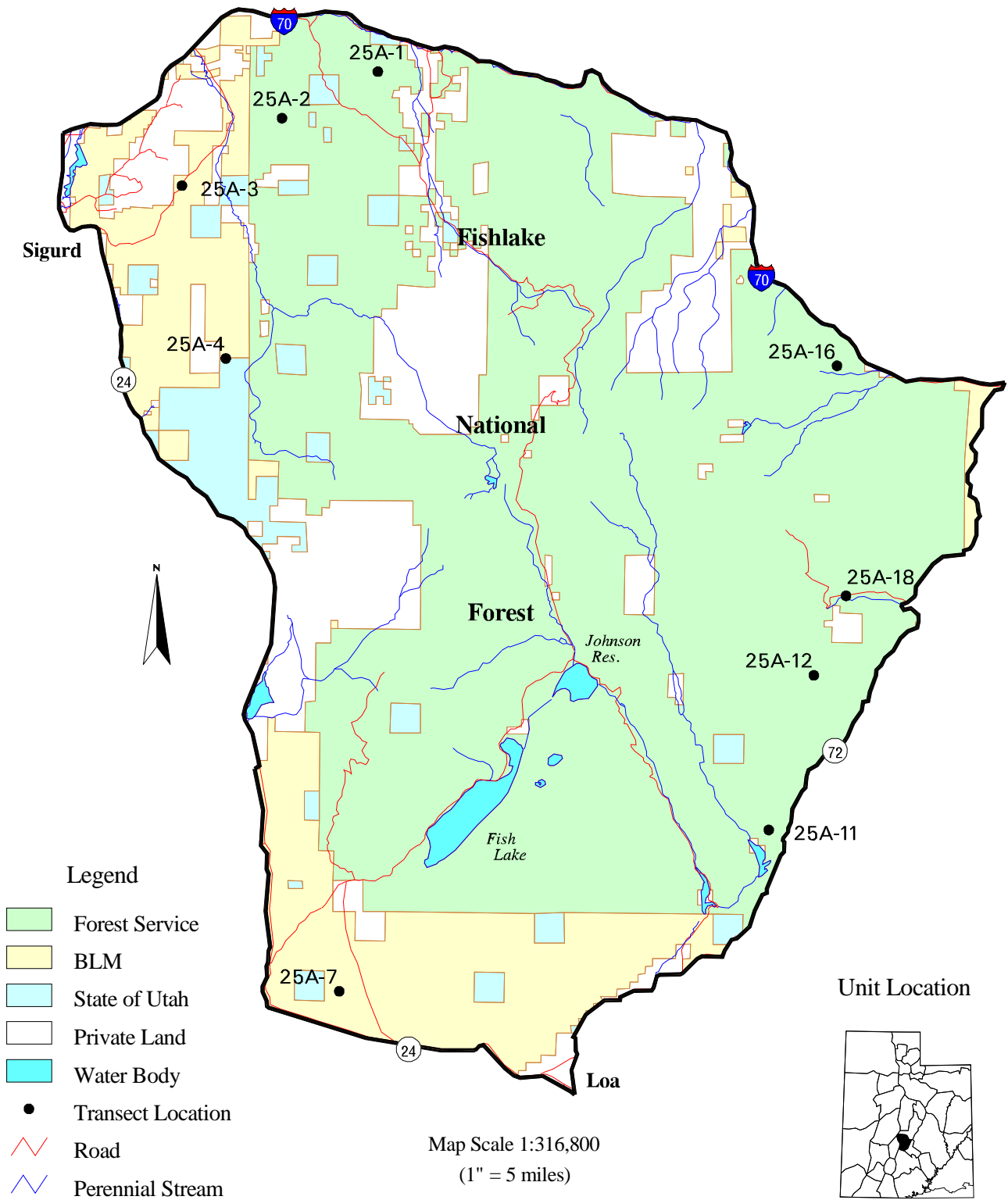


Management Unit 25A



WILDLIFE MANAGEMENT UNIT 25A - PLATEAU, FISH LAKE

Boundary Description

Sevier, Wayne and Piute Counties - Boundary begins at Highway SR-24 and Highway SR-72; west and north on SR-24 to Highway US-89; north on US-89 to Interstate 70; east on I-70 to SR-72; south on SR-72 to SR-24 and beginning point.

Unit Description

Prior to 1998, the Fish Lake unit was called deer herd unit 44. In the spring of 1998 this unit was enlarged, now it is a subunit within the large Wildlife Management Unit 25 - Plateau. This wildlife management unit now incorporates the Boulder Mountains (25C), Thousand Lake Mountains (25B), and the Fish Lake Mountains (25A).

The Fish Lake unit includes Fish Lake Mountain and drainages; Otter Creek to the west and the Fremont River with its major tributaries, 7-mile Creek and UM Creek to the east. Some steep, relatively rough areas exist in the drainage heads along the northwestern side, but most of the unit is an inclined, rolling plateau. Elevation ranges from 11,599 feet on Mt. Marvine to 7,040 feet at Loa. The northern two-thirds of the unit includes the higher elevations of the Fish Lake Mountains and constitutes summer range for deer and elk. Winter range is primarily confined to the lower elevations of the southern third of the unit and the sagebrush benches on the west side above Highway 24. Antelope are present and are normally found in the more open areas of the deer and elk winter range. Sage grouse are found near water in the same areas as those used by antelope. Fish Lake, Johnson Reservoir, Mill Meadow Reservoir, and Forsyth Reservoir are all popular summer fishing and camping areas. The higher portions of the unit are also popular elk and deer hunting areas. Another major public land use of the area is livestock grazing.

Huff and Blotter (1964) identified four dominant vegetation types on the winter range. Sagebrush was the most prevalent type. Black sagebrush (*Artemisia nova*) was the dominant species with islands of big sagebrush (*A. tridentata*) scattered throughout. Pinyon-juniper was the second most common vegetation type. Pinyon-juniper occupies primarily southern slopes at higher elevations and is dispersed in patches throughout the lower elevations. Mountain brush can be found along the upper limits of the winter range. The mixed types occur in localized areas throughout the winter range.

The normal winter range can be found between 7,200 and 9,000 feet (Huff and Blotter 1964). Excessive accumulations of snow during severe winters confine deer below the 8,600-foot contour. Pinyon-juniper on both normal and severe wintering areas provide extremely important protective cover for elk and deer, while the closely associated sagebrush type produces the bulk of the required forage. In an update on winter range needs in the state, Mann (1985) considered the public land on the unit adequate to meet the wintering needs of deer without acquiring additional land from the private sector. The percent of the winter range that is administered by the BLM and USFS is respectively 30% and 47%. The Forest Service is responsible for managing almost all of the summer range (83%).

A history of heavy overgrazing by sheep and cattle is largely responsible for the present composition of most of the vegetative communities. Grazing began in the 1860's when the first settlers arrived in the Fremont Valley. Cattle, horses, and sheep grazed unregulated and range conditions deteriorated as herds increased. The result was overuse of the valuable cool-season grasses and forbs and degradation of the range in general. Even after the inception of the Forest Reserve (the predecessor to the Forest Service) in 1906, the situation worsened until livestock numbers peaked in 1924. Although overgrazing still occurs in many areas, grazing restrictions and management plans have been implemented on both Forest Service and BLM lands. Range conditions are improving in most areas.

Browse species increased as the competition from grasses and forbs was reduced by the heavy grazing. The result was large areas of deer winter range with abundant browse forage. However, good spring-fall deer range or transition range is lacking. During these seasons, deer seek succulent green grasses and forbs. Because the herbaceous component is inadequate, depredation occurs on private croplands, especially alfalfa fields. The DWR is working with the other agencies to improve spring-fall ranges with chaining, spraying, harrowing, and/or seeding projects.

Mining activities are nonexistent on the area, but gas and oil exploration and road building are current land management concerns. There is presently a moderately high density of roads on the area. Although off-road use of vehicles is prohibited, ORV's and four-wheel drive vehicles can go almost anywhere and new roads are being created each year. Winter traffic and the increase of unregulated winter recreation will have a negative impact on big game.

Wildlife Management Unit Objectives

The current wildlife management objectives are to achieve a target winter herd size of 6,200 deer (stabilize the west side of the unit and increase the east side). A post season herd composition 15 bucks to 100 does with 30% of the bucks being 3 point or better will be maintained. The target winter herd size for elk is 4,800 for subunits 25A Fish Lake and 25B Thousand Lake. A herd composition of a minimum 8 bulls to 100 cows with 4 of those bulls being 2 ½ years of age or older will be maintained.

The Fish Lake deer unit is part of the Parker Mountain antelope unit. One hundred and twenty-nine pronghorns were transplanted to the Parker unit from Montana in 1964 and 1965. Because this antelope unit has done so well, antelope from this expanding herd have been transplanted to other areas of the state. Additionally, the yearly harvest has increased from 36 in 1974 to 133 in 1984 ???need data after 1984??? with an average hunter success rate of 93%. The Fish Lake part of the Parker Mountain antelope unit supports a modest portion of the total herd, but will likely become more important if the herd continues to expand.

Trend Study Site Description

Twelve trend study sites were placed within the Fish Lake unit in 1985. Eleven of the 12 study sites occur on deer and elk winter range and one on summer range. In 1991, all sites were reread and 3 additional summer or transitional range sites were established at East Tidwell #25A-12, Ox Spring #25A-13, and Row of Pines Enclosure #25A-14. These 15 trend studies were read again in 1999. Two additional study sites were established in 1999, within the Row of Pines enclosure. One samples the livestock enclosure (#25A-19) and the other samples the total enclosure (#25A-20). Data from these sites can be compared with the Row of Pines enclosure trend study site #25A-14, which samples the area outside of the enclosure.

Trend Study 25A-1-99

Study site name: Triangle Mountain .

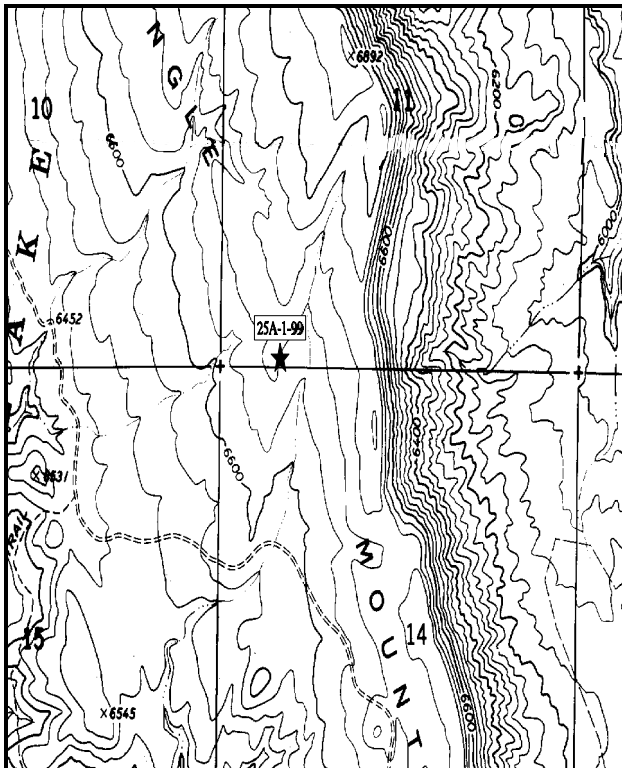
Range type: Chained, Cabled, Seeded P-J.

Compass bearing: frequency baseline 180°M.

Footmark (first frame at) 5 feet, footmarks (frequency belts) line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

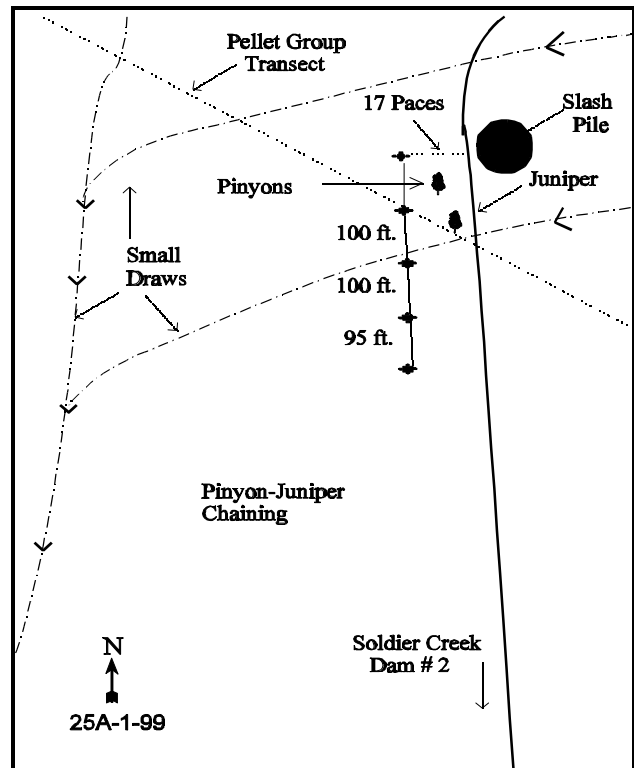
LOCATION DESCRIPTION

From the Gooseberry Creek Road outside Salina, take the Soldier Canyon Road west approximately 2.5 miles to Soldier Creek Dam #2. At the dam, turn right up the road to Triangle Mountain. Go 1.55 miles to a fork. Take the right fork 0.6 miles to the top of a low rise between 2 small draws. Walk 17 paces due west of the road to the 0-foot baseline stake, which is a 4-foot rebar with a red browse tag, #7030, attached. A pellet group transect crosses the frequency baseline at the 100-foot mark.



Map Name: Salina, Utah

Township 22S , Range 1E , Section 11



Diagrammatic Sketch

UTM 4306249.677 N, 433224.714 E

DISCUSSION

Trend Study No. 25A-1 (43-1)

The Triangle Mountain study is located on the gently sloping (5%-10%) southwest side of Triangle Mountain in the Fish Lake National Forest at an elevation of 6,700 feet. The area was formerly dominated by pinyon-juniper, and was chained and seeded in 1970. It is presently occupied by evenly scattered young pinyon and juniper trees that escaped the chain, and seeded perennial grasses. Cattle use the area in early summer and the grazing is heavy. The area is within the Brown's Hole allotment which allows grazing for approximately a two week period from June 1st to June 15 depending on conditions. In 1985, deer use, at a nearby pellet group transect, was low (31 deer days use/hectare) when compared to the figures shown by other pellet group transects on the herd unit (average 69 deer days use/hectare) (Jense et al. 1985). In 1991, elk use averaged only 7 days use/acre (18 days use/hectare). Pellet group transect data taken along the study site baseline in 1999 estimate 21 deer days use/acre (53 ddu/ha), 66 elk days use/acre (162 edu/ha), and 49 cow days use/acre (120 cdu/ha).

The soil is a light-colored, loam soil that is relatively shallow due to the prevalence of rock on the surface and throughout the profile. The estimated effective rooting depth is just under 12 inches. It is derived from a limestone parent material, and has a slightly alkaline pH (7.6). The amount of phosphorus is low and could be a limiting factor at 6.5 ppm where 10 ppm is considered minimal for normal plant growth and development. Organic matter is high at 5.8%, with a good amount of litter on the surface. Erosion is not severe due to the gentle slope and adequate cover from herbaceous vegetation and litter. The area itself is quite dry with an average of about 10 inches of precipitation per year measured in Salina (5 miles away to the northwest and 1,600 feet lower).

Browse is infrequent at the site, resulting in light use by deer. Black sagebrush is the most important species, but has a very low density, currently ('99) estimated at 480 plant/acre. Use is mostly light on this species, recruitment is high (38%), with a moderate biotic potential (7%). No plants were classified as decadent in 1999. White-stemmed rubber rabbitbrush is scattered throughout the site in low numbers. The young pinyons and junipers average 5 feet in height and are evenly disbursed and vigorous. Densities for these species are currently ('99) estimated at 43 pinyon trees/acre and 35 juniper trees/acre. Some junipers are lightly hedged. Nearby, more dense stands of pinyon-juniper provide good cover.

Herbaceous vegetation makes up the majority of the vegetation cover at the site. Currently, grasses and forbs respectively provide 68% and 29% of the total vegetation cover. Seeded perennial species dominate the understory. The major species present are: crested wheatgrass, intermediate wheatgrass, and Russian wildrye. Crested wheatgrass is the dominate species overall, occurring in over 80% of the sampling quadrats in all years. It currently provides 42% of the total vegetation cover at the site. This species is lower in stature (an indication of poor site potential) and shows moderate to heavy utilization. Intermediate wheatgrass also shows utilization on the larger plants. Russian wildrye is scattered throughout the site in clumps that display a halo effect. Cheatgrass was sampled in 1999, however, it is infrequent occurring in only 4 quadrats. Seeded alfalfa, the most valuable forb, is stunted and heavily utilized. It has a stable frequency over all sampling periods. The annual, pale alyssum, is abundant and provides 28% of the forb cover. Other forbs are infrequent and unimportant.

1985 APPARENT TREND ASSESSMENT

Juniper and pinyon are regaining their former dominance in the chained areas with good vigor and virtually no competition. Other browse species are sporadic but may be slowly increasing. The grasses are well-established. The soil condition is poor, but relatively stable considering the relatively high amount of bare soil.

1991 TREND ASSESSMENT

It appears that the juniper and pinyon trees, on the site, are those that escaped the chaining treatment and have been released from competing with the older adult trees. Density for the key browse species, black sagebrush, has increased by 67%, but is still low at about 200 plants per acre. This increase in density for black sagebrush would be expected to continue. All major seeded grasses have increased sum of nested frequency and quadrat frequency values. Another plus is that alfalfa has also increased since 1985, at which time it was questioned if it would survive. It has a 49% quadrat frequency, which is excellent for a 20 year old chaining. Bare ground has also decreased substantially.

TREND ASSESSMENT

soil - up

browse - up

herbaceous understory - up

1999 TREND ASSESSMENT

Trend for soil is stable. Erosion is minimal due to adequate protective cover from herbaceous vegetation and litter. Percent cover from bare ground has stayed nearly the same as the previous reading. Trend for browse is stable, but insignificant on this site. Black sagebrush is the most abundant species, but it occurs at a very low density. Trend for the herbaceous understory is stable. Sum of nested frequency for perennial grasses decreased slightly, but the most abundant species, crested wheatgrass and Russian wildrye, have remained stable while nested frequency of intermediate wheatgrass has increased slightly. Sum of nested frequency for perennial forbs remained stable. Herbaceous plants are low in stature and moderately to heavily utilized.

TREND ASSESSMENT

soil - stable

browse - stable, but insignificant

herbaceous understory - stable

HERBACEOUS TRENDS --

Herd unit 25A, Study no: 1

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover % '99
		'85	'91	'99	'85	'91	'99	
G	Agropyron cristatum	267	293	242	91	94	81	7.19
G	Agropyron intermedium	_a 109	_b 158	_b 180	48	63	68	2.45
G	Agropyron smithii	_a 1	_b 18	_a -	1	6	-	-
G	Agropyron spicatum	7	7	2	3	4	1	.00
G	Bromus tectorum (a)	-	-	6	-	-	4	.02
G	Elymus junceus	79	99	95	37	42	43	1.76
G	Festuca ovina	_b 9	_c 25	_a -	6	12	-	-
G	Oryzopsis hymenoides	-	-	1	-	-	1	.00
G	Poa secunda	_a -	_a -	_b 29	-	-	15	.20
G	Sitanion hystrix	3	-	-	1	-	-	-
Total for Annual Grasses		0	0	6	0	0	4	0.01
Total for Perennial Grasses		475	600	549	187	221	209	11.62

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover % 09
		'85	'91	'99	'85	'91	'99	
	Total for Grasses	475	600	555	187	221	213	11.64
F	Alyssum alyssoides (a)	-	-	260	-	-	88	1.41
F	Antennaria rosea	_b 18	_a -	_b 7	10	-	4	.04
F	Aster spp.	5	-	1	2	-	1	.00
F	Astragalus spp.	1	11	6	1	6	4	.21
F	Chaenactis douglasii	-	2	-	-	1	-	-
F	Cryptantha spp.	_a -	_b 19	_c 52	-	10	18	.92
F	Hymenoxys acaulis	_a -	_b 8	_a -	-	4	-	-
F	Lithospermum ruderales	1	1	3	1	1	1	.03
F	Medicago sativa	74	110	99	36	49	50	2.43
F	Phlox austromontana	_{ab} 4	_b 13	_a 1	2	6	1	.00
F	Ranunculus testiculatus (a)	-	-	3	-	-	1	.00
F	Townsendia spp.	-	6	-	-	2	-	-
	Total for Annual Forbs	0	0	263	0	0	89	1.41
	Total for Perennial Forbs	103	170	169	52	79	79	3.65
	Total for Forbs	103	170	432	52	79	168	5.07

Values with different subscript letters are significantly different at $\alpha = 0.10$ (annuals excluded)

BROWSE TRENDS --

Herd unit 25A, Study no: 1

Type	Species	Strip Frequency 09	Average Cover % 09
B	Artemisia nova	15	.01
B	Chrysothamnus nauseosus	2	-
B	Chrysothamnus viscidiflorus	2	-
B	Gutierrezia sarothrae	1	-
B	Leptodactylon pungens	2	-
B	Pinus edulis	3	.48
	Total for Browse	25	0.49

CANOPY COVER --

Herd unit 25A, Study no: 1

Species	Percent Cover 09
Pinus edulis	3

BASIC COVER --

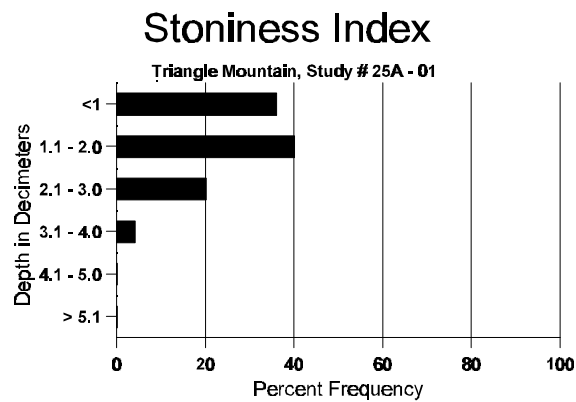
Herd unit 25A, Study no: 1

Cover Type	Nested Frequency 09	Average Cover %		
		'85	'91	'99
Vegetation	348	10.50	12.50	19.34
Rock	179	4.50	4.75	4.50
Pavement	295	19.50	13.50	10.88
Litter	340	30.75	48.00	26.33
Cryptogams	40	0	.50	1.20
Bare Ground	284	34.75	20.75	18.20

SOIL ANALYSIS DATA --

Herd Unit 25A, Study # 01, Study Name: Triangle Mountain

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
11.7	54.8 (12.7)	7.6	40.0	34.7	25.3	5.8	6.5	243.2	0.7



PELLET GROUP FREQUENCY --

Herd unit 25A, Study no: 1

Type	Quadrat Frequency 09	Pellet Transect Days Use/Acre (ha) 09
Rabbit	27	n/a
Elk	18	66(163)
Deer	18	21(52)
Cattle	10	49(121)

BROWSE CHARACTERISTICS --

Herd unit 25A, Study no: 1

Field Unit 25A, Study No. 1																		
A G R E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Artemisia nova																		
S	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	-	2	-	-	-	-	-	-	-	2	-	-	-	40			2
Y	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	2	-	-	-	-	-	-	-	-	2	-	-	-	133			2
	99	9	-	-	-	-	-	-	-	-	9	-	-	-	180			9
M	85	1	-	-	-	-	-	-	-	-	1	-	-	-	66	12	20	1
	91	-	1	-	-	-	-	-	-	-	-	1	-	-	66	19	36	1
	99	8	7	-	-	-	-	-	-	-	14	1	-	-	300	15	23	15
X	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	60			3
% Plants Showing		<u>Moderate Use</u>				<u>Heavy Use</u>				<u>Poor Vigor</u>				<u>%Change</u>				
'85		00%				00%				00%				+67%				
'91		33%				00%				00%				+59%				
'99		29%				00%				00%								
Total Plants/Acre (excluding Dead & Seedlings)												'85	66	Dec:	-			
												'91	199		-			
												'99	480		-			
Chrysothamnus nauseosus																		
Y	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	5	-	-	-	-	-	-	-	-	4	-	1	-	333			5
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
M	85	1	-	-	-	-	-	-	-	-	1	-	-	-	66	14	9	1
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20	18	16	1
D	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	1	-	-	-	-	1	-	-	-	66			1
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
% Plants Showing		<u>Moderate Use</u>				<u>Heavy Use</u>				<u>Poor Vigor</u>				<u>%Change</u>				
'85		00%				00%				00%				+83%				
'91		17%				00%				17%				-90%				
'99		00%				00%				00%								
Total Plants/Acre (excluding Dead & Seedlings)												'85	66	Dec:	0%			
												'91	399		17%			
												'99	40		0%			

A G R E	Y	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Chrysothamnus viscidiflorus																		
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	99	2	-	-	-	-	-	-	-	-	-	2	-	-	40	8	8	2
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
		'85			00%			00%			00%							
		'91			00%			00%			00%							
		'99			00%			00%			00%							
Total Plants/Acre (excluding Dead & Seedlings)												'85	0	Dec:	-			
												'91	0		-			
												'99	40		-			
Gutierrezia sarothrae																		
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	99	1	-	-	-	-	-	-	-	-	-	1	-	-	20	9	7	1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
		'85			00%			00%			00%							
		'91			00%			00%			00%							
		'99			00%			00%			00%							
Total Plants/Acre (excluding Dead & Seedlings)												'85	0	Dec:	-			
												'91	0		-			
												'99	20		-			
Leptodactylon pungens																		
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	99	3	-	-	-	-	-	-	-	-	-	3	-	-	60	4	13	3
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
		'85			00%			00%			00%							
		'91			00%			00%			00%							
		'99			00%			00%			00%							
Total Plants/Acre (excluding Dead & Seedlings)												'85	0	Dec:	-			
												'91	0		-			
												'99	60		-			
Pinus edulis																		
M	85	1	-	-	-	-	-	-	-	-	1	-	-	-	66	51	31	1
	91	1	-	-	-	-	-	-	-	-	1	-	-	-	66	72	75	1
	99	3	-	-	-	-	-	-	-	-	3	-	-	-	60	-	-	3
X	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	20			1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
		'85			00%			00%			00%			+ 0%				
		'91			00%			00%			00%			- 9%				
		'99			00%			00%			00%							
Total Plants/Acre (excluding Dead & Seedlings)												'85	66	Dec:	-			
												'91	66		-			
												'99	60		-			

Trend Study 25A-2-99

Study site name: Black Mountain.

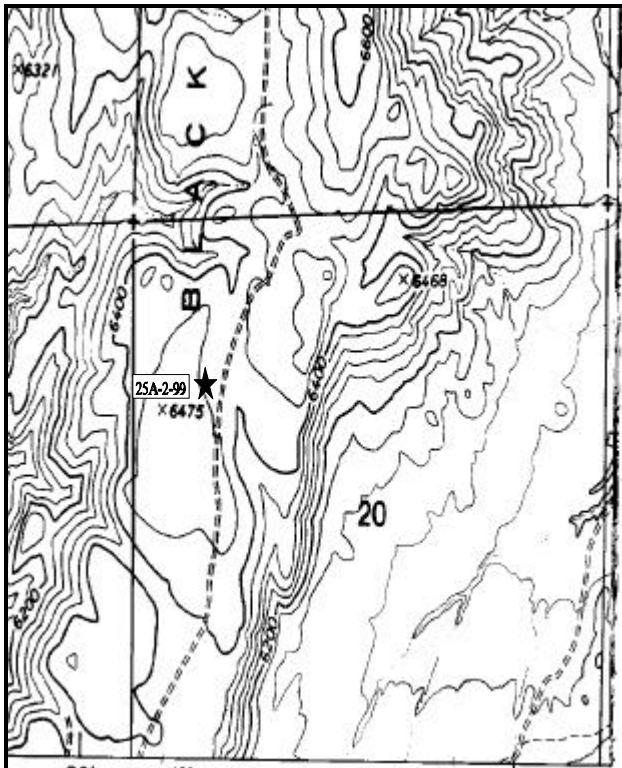
Range type: Chained, Cabled, Seeded P-J.

Compass bearing: frequency baseline 180°M.

Footmark (first frame at) 5 feet, footmarks (frequency belts) line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

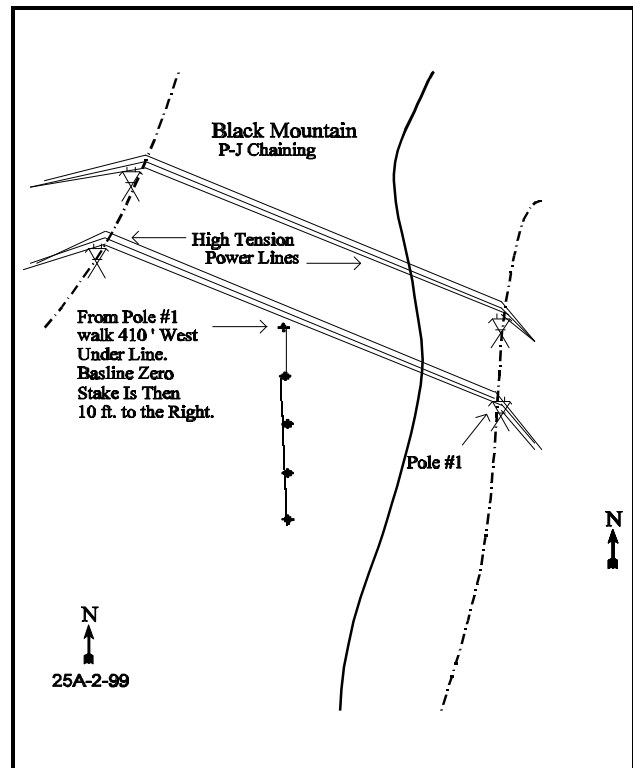
LOCATION DESCRIPTION

From Soldier Canyon Dam #2, proceed 1.85 miles west on the Soldier Canyon Road to the Black Mountain Road. Make a sharp left turn onto this road and travel south-southeast 0.95 miles to a junction. Take the right fork 0.85 miles to the double high-tension powerlines. The transect starts under these lines on the mesa to the right. Continue 1.1 miles beyond the powerlines to a 90-degree fork to the right. Turn right and go 0.55 miles to another fork. Stay to the right and proceed 1.15 miles up the hill and across a chaining until you are between the powerlines. Starting from the pole (#1) east of the road, pace off 410 feet west directly under the lines to the start of the frequency baseline. The 0 foot post is marked with browse tag #7028.



Map Name: Salina, Utah

Township 22S, Range 1E, Section 20



Diagrammatic Sketch

UTM 4303753.249 N, 428084.544 E

DISCUSSION

Trend Study No. 25A-2 (43-2)

The Black Mountain trend study was Ely chained and seeded in 1984. Slope is less than 5% with a slight southern aspect and an elevation of 6,400 feet. The distance to free water (at least 1.5 to 2 miles) has limited livestock use of the area. Cattle have grazed the area for the past 30 or more years, but historically it has had only light to moderate use. Before then, there was heavy pressure from sheep and deer. Cattle now use the area in late spring for about 2 weeks on their way to summer range as part of the Browns Hole allotment. Pellet group data from the site in 1999 estimate 24 cow days use/acre (59 cdu/ha). About half of the cattle pats encountered were recent while the other half were from last season. Use by wildlife is moderate to heavy. Deer use averaged 27 deer days use/acre (68 dd/ha) from 1985 to 1991 on a nearby pellet group transect. Use by deer at the site is currently estimated at 78 deer days use/acre (192 ddu/ha). In the past, elk use has been light most years with three elk days use/hectare being reported in the winter of 1983-84 (Jense et al. 1985). Use by elk is increasing with pellet group transect data in 1999 estimating 38 elk days use/acre (93 edu/ha).

The soil has a sandy clay loam texture with a slightly alkaline pH (7.6). It is moderately shallow with an estimated effective rooting depth under 12 inches. A gravelly layer is present approximately 12 inches below the surface. Organic matter is higher than expected at this site, currently 3.5%. Phosphorus is low at 5.7 ppm where 10 ppm has been shown to be minimal for normal plant growth and development. Bare ground is currently ('99) at 30% cover, which is not excessive for a characteristically dry area that was chained.

The chaining effectively removed the dominant overstory of mature juniper-pinyon and reduced it to widely scattered young trees. Density for juniper is currently ('99) estimated at 72 trees/acre, and pinyon at 23 trees/acre. Browse is more abundant on this site compared to the chaining at Triangle Mountain (#25A-1), but preferred species are still relatively low in density. Black sagebrush is present, which is expected with the shallow soils. The population has remained fairly stable over all sampling years, currently estimated at 860 plants/acre, a 30% increase from 1991. Recruitment from young plants is high at 21%, and percent decadency is low at 5%. Use is light to moderate at the present time. A few mountain big sagebrush plants were sampled in 1999 due to the much larger (more than three times larger) sample now used. This species was included in the seed mix, however this is a marginally dry site for this species. Plants are low in stature and moderately hedged. Stickyleaf low rabbitbrush is the most numerous shrub on the site, currently estimated at 2,200 plants/acre. The current density represents nearly a 4-fold increase since 1991. This species is mostly mature, but has high recruitment at 25% in 1999. This could indicate a possible continued expansion of its population. Use is moderate on this species with 20% displaying moderate use, and an additional 16% showing heavy use. Sixteen percent were classified with poor vigor. It appears that dwarf rabbitbrush (*Chrysothamnus depressus*) was misidentified in 1985 and 1991. All of the rabbitbrush encountered in 1999 were stickyleaf low rabbitbrush (*Chrysothamnus viscidiflorus viscidiflorus*).

Grass composition is dominated by a variety of seeded and native perennial species. Indian ricegrass and bottlebrush squirreltail were the most abundant native perennial grasses. Seeded species such as crested and intermediate wheatgrass, smooth brome, Russian wildrye, and sheep fescue are present, although less abundant than the natives. Most of the perennial species displayed moderate to heavy use in 1999. Cheatgrass, an annual, is now the most common herbaceous species, occurring in 54% of the quadrats and having a sum of nested frequency of 133. It mainly occurs in scattered patches throughout the site.

Forb density and diversity is low. Increasers, annuals or biennials such as Russian thistle and prickly lettuce were most common immediately after the chaining. Since then however, forbs have nearly disappeared from the understory altogether. In 1999, only 4 species were sampled, with pale alyssum, an annual, being the most abundant in cover and frequency. The seeded forbs, alfalfa, small burnet, and yellow sweet clover were not encountered in 1999.

1985 APPARENT TREND ASSESSMENT

Trend will depend upon the success of the Seeding. Any assessment this soon would be tentative at best. However, it would appear that trend of both soils and vegetative composition can only be up.

1991 TREND ASSESSMENT

This site is dryer than the Triangle Mountain site (25A-1) and is evidenced by the slow recovery for most species on this chained site. Most of the seeded grasses are increasing in sum of nested and quadrat frequency values, but it has been slow because of the prolonged drought. The major three native grasses are also increasing in numbers and distribution (bluebunch wheatgrass, Indian ricegrass, and bottlebrush squirreltail). The alfalfa that was seeded has almost disappeared now. The black sagebrush is also showing the effects of the extended drought. It's population has decreased by 40% and percent decadency has increased to 33%. These are not good signs, but with a change in the weather patterns, we would expect the grasses and black sagebrush to recover. Because of these decreases in vegetation, percent bare ground has increased dramatically from 20% to 38%. However, litter cover has remained similar and nested frequency of grasses and forbs have increased.

TREND ASSESSMENT

soil - down slightly, because of the increase in bare ground

browse - down

herbaceous understory - up slightly

1999 TREND ASSESSMENT

Trend for soil is stable, but still in poor condition. Herbaceous vegetation and litter are low for a chained and seeded site due to the shallow soils and extended drought during the mid-90's. Bare ground cover is moderately high at 30% cover, but the gentle slope holds erosion to minimal levels. Trend for browse is stable overall. Black sagebrush, the most numerous preferred species, shows a 30% increase in density, and has high recruitment from young plants at 21%. Percent decadency is low at 5%, with use light to moderate. On a negative note, stickyleaf low rabbitbrush is the most numerous species on the site, increasing by 73% since 1991. It appears that this species will continue to increase with the young age class making up 25% of the population. The herbaceous understory shows a stable trend for grasses, while forbs continue to decline. Perennial forbs are nearly non existent and annual grasses and forbs are increasing. Perennial forbs, primarily the seeded species, have disappeared from the understory altogether. Perennial grasses have remained stable in their sum of nested frequency overall, but show moderate to heavy use.

TREND ASSESSMENT

soil - stable, but in poor condition

browse - stable overall, but poor composition

herbaceous understory - stable

HERBACEOUS TRENDS --

Herd unit 25A, Study no: 2

T y p e	Species	Nested Frequency			Quadrat Frequency			Average Cover % 09
		'85	'91	'99	'85	'91	'99	
G	Agropyron cristatum	_a 14	_b 57	_b 41	5	29	19	.75
G	Agropyron intermedium	_a 9	_b 88	_a 42	6	36	17	.89
G	Agropyron smithii	_b 4	_a -	_a -	3	-	-	-
G	Agropyron spicatum	_a 5	_b 45	_a 6	2	16	3	.09
G	Bromus inermis	_a 4	_a 6	_b 73	2	5	29	1.20
G	Bromus tectorum (a)	-	-	133	-	-	54	1.31
G	Elymus junceus	_a -	_b 9	_b 12	-	3	6	.11
G	Festuca ovina	_a -	_b 10	_b 27	-	6	11	.37
G	Oryzopsis hymenoides	68	77	95	34	36	38	2.92
G	Poa fendleriana	2	-	6	1	-	2	.06
G	Poa secunda	_a -	_a -	_b 5	-	-	3	.06
G	Sitanion hystrix	_a 49	_b 89	_{ab} 80	28	41	39	1.58
Total for Annual Grasses		0	0	133	0	0	54	1.31
Total for Perennial Grasses		155	381	387	81	172	167	8.06
Total for Grasses		155	381	520	81	172	221	9.38
F	Alyssum alyssoides (a)	-	-	189	-	-	69	.62
F	Antennaria rosea	_b 6	_a -	_a -	4	-	-	-
F	Astragalus spp.	_a 4	_b 30	_a 14	3	16	7	.11
F	Castilleja spp.	-	2	-	-	1	-	-
F	Chaenactis douglasii	_a -	_b 12	_a -	-	6	-	-
F	Cryptantha spp.	-	-	1	-	-	1	.00
F	Erigeron engelmannii	-	2	-	-	1	-	-
F	Eriogonum ovalifolium	_a -	_b 14	_a -	-	6	-	-
F	Lactuca serriola	_a -	_b 7	_a -	-	5	-	-
F	Machaeranthera canescens	-	4	-	-	2	-	-
F	Medicago sativa	_b 14	_a 1	_a -	8	1	-	-
F	Phlox longifolia	_a -	_b 12	_a -	-	6	-	-
F	Salsola iberica (a)	_a 1	_b 19	_a -	1	7	-	-
F	Sanguisorba minor	_b 29	_a 1	_a -	14	1	-	-
F	Senecio multilobatus	3	-	-	1	-	-	-
F	Streptanthus cordatus	2	2	-	1	2	-	-
F	Taraxacum officinale	-	1	-	-	1	-	-
F	Tragopogon dubius	_a -	_{ab} 3	_b 10	-	1	4	.02
F	Unknown forb-perennial	-	2	-	-	1	-	-
Total for Annual Forbs		1	19	189	1	7	69	0.62
Total for Perennial Forbs		58	93	25	31	50	12	0.13
Total for Forbs		59	112	214	32	57	81	0.75

Values with different subscript letters are significantly different at $\alpha = 0.10$ (annuals excluded)

BROWSE TRENDS --

Herd unit 25A, Study no: 2

Type	Species	Strip Frequency '99	Average Cover % '99
B	Artemisia nova	26	1.70
B	Artemisia tridentata vaseyana	1	-
B	Chrysothamnus depressus	0	-
B	Chrysothamnus viscidiflorus viscidiflorus	42	2.12
B	Juniperus osteosperma	8	1.83
B	Pinus edulis	1	.03
Total for Browse		78	5.70

BASIC COVER --

Herd unit 25A, Study no: 2

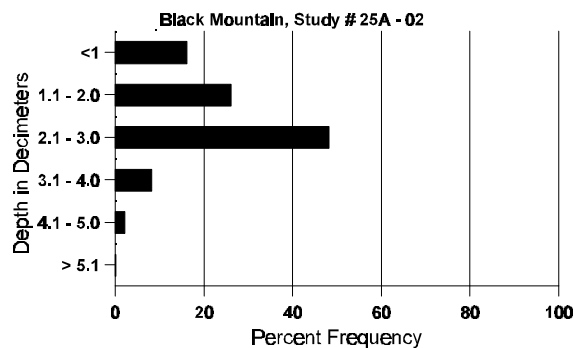
Cover Type	Nested Frequency '99	Average Cover %		
		'85	'91	'99
Vegetation	319	1.50	3.00	18.36
Rock	150	1.75	3.25	4.71
Pavement	311	30.25	14.00	11.60
Litter	312	46.50	42.00	21.79
Cryptogams	7	0	0	.05
Bare Ground	311	20.00	37.75	29.98

SOIL ANALYSIS DATA --

Herd Unit 25A, Study # 02, Study Name: Black Mountain

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
11.7	56.0 (11.0)	7.6	50.0	25.1	24.9	3.5	5.7	316.8	0.5

Stoniness Index



PELLET GROUP FREQUENCY --

Herd unit 25A, Study no: 2

Type	Quadrat Frequency Ø9	Pellet Transect Days Use/Acre (ha) Ø9
Rabbit	18	n/a
Elk	15	38(94)
Deer	24	78(193)
Cattle	16	24(59)

BROWSE CHARACTERISTICS --

Herd unit 25A, Study no: 2

Form Class (No. of Plants)																				Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
A G R E	Y R	1	2	3	4	5	6	7	8	9	1	2	3	4													
Artemisia nova																											
S	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0									
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0									
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	20			1									
Y	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0									
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0									
	99	2	7	-	-	-	-	-	-	-	-	9	-	-	180			9									
M	85	13	-	-	-	-	-	-	-	-	13	-	-	-	866	6	7	13									
	91	6	-	-	-	-	-	-	-	-	6	-	-	-	400	8	11	6									
	99	23	8	-	1	-	-	-	-	-	32	-	-	-	640	11	18	32									
D	85	1	1	-	-	-	-	-	-	-	2	-	-	-	133			2									
	91	3	-	-	-	-	-	-	-	-	3	-	-	-	200			3									
	99	-	2	-	-	-	-	-	-	-	2	-	-	-	40			2									
X	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0									
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0									
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	20			1									
% Plants Showing		<u>Moderate Use</u>				<u>Heavy Use</u>				<u>Poor Vigor</u>				<u>%Change</u>													
'85		07%				00%				00%				-40%													
'91		00%				00%				00%				+30%													
'99		40%				00%				00%																	
Total Plants/Acre (excluding Dead & Seedlings)														'85	999	Dec:	13%										
														'91	600		33%										
														'99	860		5%										

A G R E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Artemisia tridentata vaseyana																		
Y	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	2	-	-	-	-	-	-	-	2	-	-	-	40		2	
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0	13 16	0	
X	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	60		3	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		00%			00%			00%										
'91		00%			00%			00%										
'99		100%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	0	Dec:	-			
												'91	0		-			
												'99	40		-			
Chrysothamnus depressus																		
Y	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	85	6	-	-	-	-	-	-	-	-	6	-	-	-	400	7 7	6	
	91	3	-	-	-	-	-	-	-	-	3	-	-	-	200	13 14	3	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0	- -	0	
D	85	2	-	-	-	-	-	-	-	-	2	-	-	-	133		2	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		00%			00%			00%			-50%							
'91		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	533	Dec:	25%			
												'91	266		0%			
												'99	0		0%			

A G R E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Chrysothamnus viscidiflorus viscidiflorus																		
S	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	1	-	-	-	-	-	-	-	-	-	-	-	-	66		1	
	99	-	2	-	-	-	-	-	-	-	-	-	-	-	40		2	
Y	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	4	-	-	-	-	-	-	-	-	-	-	-	-	266		4	
	99	15	12	-	-	-	-	-	-	-	-	-	-	-	540		27	
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
	91	5	-	-	-	-	-	-	-	-	-	-	-	-	333	15	5	
	99	52	10	18	-	-	-	-	-	-	-	-	18	-	1600	14	80	
D	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	3	-	-	-	-	-	-	-	-	-	-	-	-	60		3	
X	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	40		2	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		00%			00%			00%										
'91		00%			00%			00%			+73%							
'99		20%			16%			16%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	0	Dec:	0%			
												'91	599		0%			
												'99	2200		3%			
Juniperus osteosperma																		
S	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	1	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
Y	85	1	-	-	-	-	-	-	-	-	-	-	-	-	66		1	
	91	1	-	-	-	-	-	-	-	-	-	-	-	-	66		1	
	99	6	-	-	-	-	-	-	-	-	-	-	-	-	120		6	
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
	99	-	-	-	-	-	-	-	2	-	2	-	-	-	40	-	2	
D	85	1	-	-	-	-	-	-	-	-	-	-	-	-	66		1	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
X	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	160		8	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		00%			00%			00%			-50%							
'91		00%			00%			00%			+59%							
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	132	Dec:	50%			
												'91	66		0%			
												'99	160		0%			

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.	Total
		1	2	3	4	5	6	7	8	9	1	2	3	4			
Pinus edulis																	
Y	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	99	1	-	-	-	-	-	-	-	-	-	-	-	1	20		1
X	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	40		2
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'85		00%			00%			00%									
'91		00%			00%			00%									
'99		00%			00%			100%									
Total Plants/Acre (excluding Dead & Seedlings)													'85	0	Dec:	-	
													'91	0		-	
													'99	20		-	

Trend Study 25A-3-99

Study site name: Sage Flat .

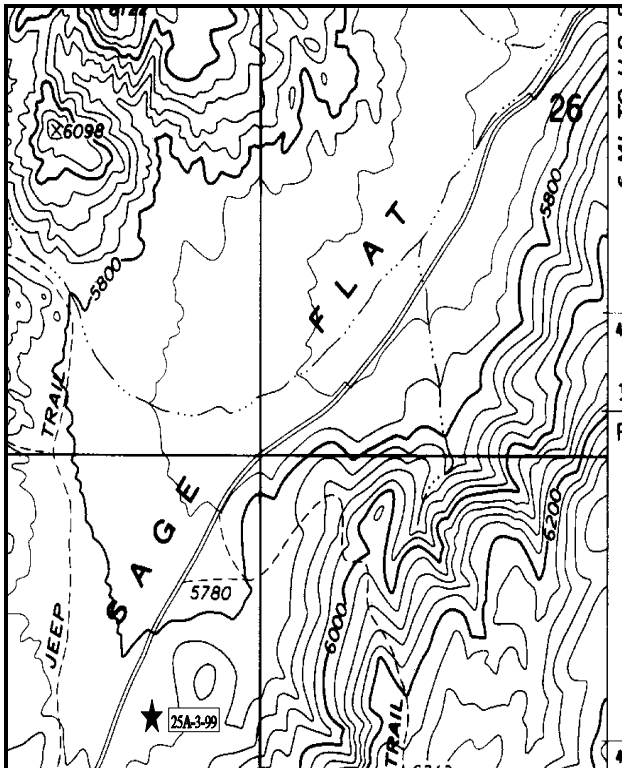
Range type: Big Sagebrush-Grass .

Compass bearing: frequency baseline 180°M.

Footmark (first frame at) 5 feet, footmarks (frequency belts) line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

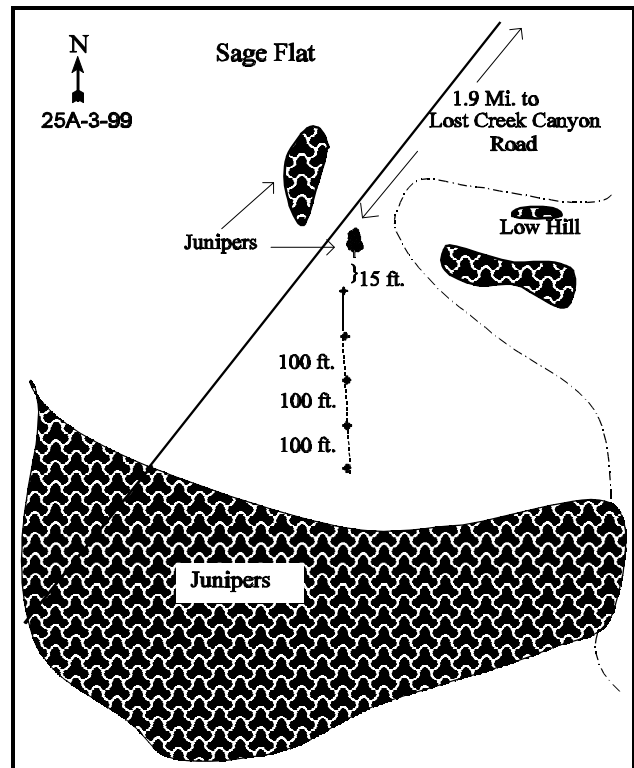
LOCATION DESCRIPTION

Beginning at the point where the Lost Creek Road passes under I-70 east of Aurora, proceed southeast up the Lost Creek Road 1.2 miles to a truck crossing. Continue past the truck crossing 1.65 miles to a bridge, then 1.05 miles beyond the bridge to a road turning off to the right. Turn right here onto the Sage Flat Road. Drive along this road for 1.9 miles to a slight bend with 5 junipers on the right side. Stop the vehicle 20-30 yards beyond these trees. On the left side of the road is a lone juniper. The baseline begins 15 feet south of this tree.



Map Name: Sigurd, Utah

Township 22S , Range 1W , Section 34



Diagrammatic Sketch

UTM 4300134.972 N, 422719.643 E

DISCUSSION

Trend Study No. 25A-3 (43-3)

The Sage Flat trend study is located in a sagebrush flat surrounded by sagebrush and juniper covered hills. The flat is dominated by Wyoming big sagebrush with a thick understory of cheatgrass at an elevation of 5,800 feet. The area is used by wintering deer, especially in severe winters when there is heavy snow at higher elevations. The BLM allows sheep grazing in the winter, with both cattle and sheep use it in the spring. However, the area is not currently used by sheep and there is little use by cows on the site. The road through the flat is well-used, and possible adverse impacts could come from off-road vehicle use. Pellet group transect data from the site in 1999 indicate heavy use by deer with an estimated 125 deer days use/acre (308 ddu/ha). Use by elk and livestock is currently light.

Soils are a fine-textured, loam to sandy loam with a slightly alkaline pH (7.7). Soil depth is moderately deep with an estimated effective rooting depth of just over 15 inches. The soil is not overly rocky on the surface or within the profile, although a gravelly layer is present at about 16 inches. Organic matter is relatively low at 1.3%, with phosphorus (5.8 ppm) also being lower than the 10 ppm. Where 10 ppm has been shown to be what is minimally necessary for normal plant growth and development. Soil movement is noticeable in a few active gullies on the site, especially along the bottom of the flat. Slight pedestaling is occurring around base of big sagebrush. However, the gentle slope of the area limits erosion to minimal levels. Bare ground slightly decreased between 1991 and 1999, due to the increase in cheatgrass cover.

The vegetation of the site is comprised primarily of two species: Wyoming big sagebrush in the overstory, and cheatgrass in the understory. Each species provides 46% of the total vegetative cover, together they provide 92% of the total vegetative cover. Wyoming big sagebrush is the only browse species sampled directly on the site. The density of this species between sampling periods has varied somewhat. The baseline was lengthened to 400 feet following the 1991 reading, and this would account for some of the differences. Density was estimated at 2,399 plants/acre in 1985, 5,199 plants/acre in 1991, and 3,500 plants/acre in 1999. The higher density in 1991 can also be attributed in part to the very large number of young plants estimated in the population that year (2,866 plant/acre). The population appears to be stable at the present time with 58% mature, 31% decadent, and 11% young. The level of decadency has remained similar since the site was established in 1985. Most of the population displays good vigor, and use is light to moderate on the majority of the population even with seemingly high use from deer estimated from pellet group transect data. Leader growth on several plants was measured at 8 inches in 1999. A greater diversity of browse species is found in the flat, with saltbush (*Atriplex spp.*), greasewood (*Sarcobatus vermiculatus*), and winterfat (*Ceratoides lanata*) occurring along the washes. Junipers are abundant and vigorous on the area surrounding the transect, but are not spreading into the flat.

The herbaceous vegetation is completely dominated by annual cheatgrass. This species presents a major fire hazard to the big sagebrush population which is not tolerant of fire. If this site were to burn in the future, the area's importance as deer winter range would most likely be greatly reduced and maybe lost altogether. Cheatgrass currently provides 99% of the grass cover, 86% of the herbaceous cover, and 46% of the total vegetation cover at the site. It occurs in 98% of the sampling quadrats at the present time, and is prohibitive to the emergence and establishment of shrub seedlings. Perennial grasses are represented by only 2 species, bottlebrush squirreltail and sand dropseed. Both species were sampled in a single quadrat in 1999. Forbs are insignificant, and made up totally of annual species.

1985 APPARENT TREND ASSESSMENT

Soil and vegetative trends appear to be downward. Continuous heavy spring grazing pressure from livestock is most responsible for the poor vegetative composition (lack of cool season herbaceous species). Although it provides important early green forage, the shallow rooted cheatgrass provides little erosion control and is a

fire hazard. In order to replace this plant with more desirable perennial grasses and forbs and reverse present trends, this site needs a rest from spring livestock grazing and may require seeding.

1991 TREND ASSESSMENT

The key browse species, Wyoming sagebrush, has increased in density by 54% without including the estimated 8,000 seedlings per acre, however 72% of the population is currently made up of young plants, which can be lost quickly with continued drought and competition with cheatgrass. It appears that the cheatgrass has increased from last time, but there is no quantifiable data for they disregarded the inventory of annual species before 1992. Very few perennial forbs or grasses were encountered on the site. Site understory composition was considered poor for it is mostly annuals.

TREND ASSESSMENT

soil - stable

browse - up, however most of the population (72%) was made up of young plants

herbaceous understory - downward, composed almost entirely of annuals, mostly cheatgrass

1999 TREND ASSESSMENT

Soil trend is stable, but in very poor condition because it depends almost entirely on cheatgrass for protective herbaceous cover. Perennial vegetation has almost entirely disappeared from the site. Herbaceous and litter cover are provided by cheatgrass which is not as good as perennial cover at holding soils in place. Soil movement is noticeable with pedestaling around the base of sagebrush and some gullies occurring on site. Browse trend is stable. Although deer use is moderately high, Wyoming big sagebrush shows a relatively stable density of mature (actually increased 50%) and decadent plants, good vigor, and mostly light to moderate use. Biotic potential is low, but recruitment from young plants is fairly good at 11%. Percent decadency has remained at similar levels between readings, currently it is at 31%. Average height and crown measurements increased between 1991 and 1999. The herbaceous understory trend is down, and in seriously poor condition. Perennial species are almost non-existent, with cheatgrass dominating the herbaceous composition. This composition creates a major fire hazard for this winter range site, where the sagebrush population could be lost if it were to burn in the future.

TREND ASSESSMENT

soil - stable, but very poor condition

browse - stable

herbaceous understory - down and in very poor condition

HERBACEOUS TRENDS --

Herd unit 25A, Study no: 3

T y p e	Species	Nested Frequency			Quadrat Frequency			Average Cover % 09
		'85	'91	'99	'85	'91	'99	
G	Bromus tectorum (a)	-	-	349	-	-	98	15.05
G	Poa secunda	3	-	-	2	-	-	-
G	Sitanion hystrix	_b 38	_b 19	_a 3	18	10	1	.03
G	Sporobolus cryptandrus	-	-	1	-	-	1	.18
Total for Annual Grasses		0	0	349	0	0	98	15.05
Total for Perennial Grasses		41	19	4	20	10	2	0.21
Total for Grasses		41	19	353	20	10	100	15.26
F	Alyssum alyssoides (a)	-	-	23	-	-	9	.17
F	Ranunculus testiculatus (a)	-	-	143	-	-	49	.88
F	Sisymbrium altissimum (a)	-	-	18	-	-	9	1.20
F	Tragopogon dubius	-	1	-	-	1	-	-
F	Unknown forb-perennial	-	1	-	-	1	-	-
Total for Annual Forbs		0	0	184	0	0	67	2.25
Total for Perennial Forbs		0	2	0	0	2	0	0
Total for Forbs		0	2	184	0	2	67	2.25

Values with different subscript letters are significantly different at $\alpha = 0.10$ (annuals excluded)

BROWSE TRENDS --

Herd unit 25A, Study no: 3

T y p e	Species	Strip Frequency 09	Average Cover % 09
B	Artemisia tridentata wyomingensis	84	14.90
B	Opuntia spp.	1	-
Total for Browse		85	14.90

BASIC COVER --

Herd unit 25A, Study no: 3

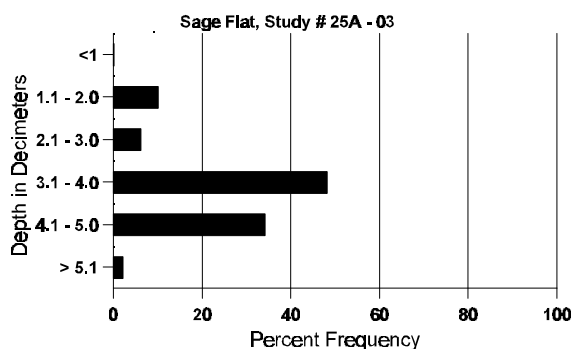
Cover Type	Nested Frequency 09	Average Cover %		
		'85	'91	'99
Vegetation	371	8.50	1.25	30.59
Rock	90	1.50	1.75	1.32
Pavement	233	7.75	19.25	10.25
Litter	343	54.25	55.25	37.05
Cryptogams	10	0	0	.09
Bare Ground	239	28.00	22.50	20.09

SOIL ANALYSIS DATA --

Herd Unit 25A, Study # 03, Study Name: Sage Flat

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
15.2	60.4 (16.8)	7.7	52.0	28.7	19.3	1.3	5.8	147.2	0.6

Stoniness Index



PELLET GROUP FREQUENCY --

Herd unit 25A, Study no: 3

Type	Quadrat Frequency 09	Pellet Transect Days Use/Acre (ha) 09
Rabbit	35	n/a
Elk	0	4(10)
Deer	53	125(309)
Cattle	2	6(15)

BROWSE CHARACTERISTICS --

Herd unit 25A, Study no: 3

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht. Cr.		
Artemisia tridentata wyomingensis																		
S	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	102	-	-	-	-	-	18	-	-	120	-	-	-	8000			120
	99	-	1	-	-	-	-	-	-	-	1	-	-	-	20			1
Y	85	2	-	-	-	-	-	-	-	-	2	-	-	-	133			2
	91	34	9	-	-	-	-	-	-	-	42	1	-	-	2866			43
	99	19	1	-	-	-	-	-	-	-	20	-	-	-	400			20
M	85	22	-	-	-	-	-	-	-	-	22	-	-	-	1466	24	26	22
	91	6	6	-	3	-	-	-	-	-	15	-	-	-	1000	21	19	15
	99	74	24	3	-	-	-	-	-	-	100	1	-	-	2020	26	34	101
D	85	11	1	-	-	-	-	-	-	-	10	-	1	1	800			12
	91	9	3	-	7	1	-	-	-	-	15	1	-	4	1333			20
	99	30	21	3	-	-	-	-	-	-	52	-	-	2	1080			54
X	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	540			27
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		03%			00%			06%			+54%							
'91		24%			00%			05%			-33%							
'99		26%			03%			01%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	2399	Dec:	33%			
												'91	5199		26%			
												'99	3500		31%			
Opuntia spp.																		
M	85	1	-	-	-	-	-	-	-	-	1	-	-	-	66	6	6	1
	91	1	-	-	-	-	-	-	-	-	1	-	-	-	66	6	13	1
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20	-	-	1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		00%			00%			00%			+ 0%							
'91		00%			00%			00%			-70%							
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	66	Dec:	-			
												'91	66		-			
												'99	20		-			

Trend Study 25A-4-99

Study site name: Durfee Homestead .

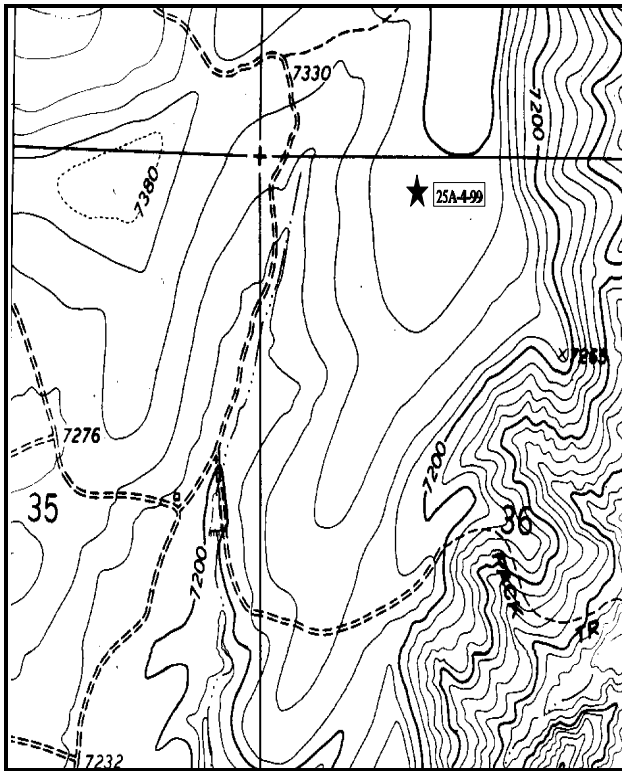
Range type: Chained, Cabled, Seeded P-J.

Compass bearing: frequency baseline 180°M.

Footmark (first frame at) 5 feet, footmarks (frequency belts) line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

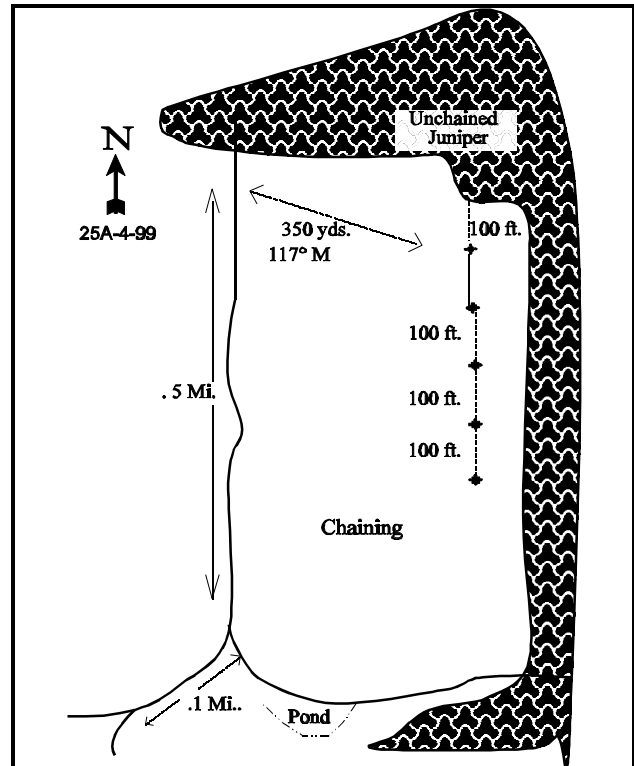
LOCATION DESCRIPTION

From Sigurd, drive east on U-24 to mile marker 21. Turn left (north) on the Sand Ledge Road and drive northeast for 1.6 miles. Turn left at the intersection and proceed north 3.1 miles to an intersection with a trough and pond. Continue 0.1 miles to a road that goes up the draw bottom. Drive up this road for 0.5 miles. Stop at the witness post (1/2" red rebar 2' tall on east side of road) and walk out 350 yards at a bearing of 132 degrees. The baseline starts out in the chaining about 100 feet from the edge of the PJ. The 0-foot baseline stake has a red browse tag #7194 attached.



Map Name: Rex Reservoir, Utah

Township 23S , Range 1W , Section 36



Diagrammatic Sketch

UTM 4290868.154 N, 425072.891 E

DISCUSSION

Trend Study No. 25A-4 (43-4)

The Durfee Homestead trend study lies on BLM administered land, in an area that was chained and seeded in 1983. The transect is on a west aspect with a 10% slope at an elevation of 7,300 feet. Scattered patches of pinyon-juniper were left as protective cover. The transect is located within 100 feet of a dense pinyon-juniper border of unchained, mature trees. Evidence of deer use in the form of pellet groups, hedging on browse species, and antler drops has been noted in the past. The area is also used in the late spring by cattle as part of the Sand Ledge allotment which is administered by the BLM. In 1999, pellet group transect data from the site indicates current use by wildlife and livestock is moderate. Deer use is estimated at 15 days use/acre (38 ddu/ha), elk use at 33 days use/acre (82 edu/ha), and livestock at 16 cow days use/acre (40 cdu/ha).

The soil is a loam to clay loam in texture, and has a slightly alkaline pH (7.5). Organic matter is moderately high at 4.3%. Rock is prevalent on the surface and throughout the profile, resulting in an estimated effective rooting depth of just under 12 inches. Currently ('99) rock and pavement together provide nearly 40% of the surface cover, with bare ground relatively low at about 20%. Litter and slash from the chaining made up 72% of the ground cover in 1985, dropping to only 21% by 1991. It appears that litter was greatly overestimated in 1985. Litter was estimated at just over 18% in 1999 with the new methods, which is close to the 1991 estimate. Erosion is minimal due to the heavily armored surface from pavement and rock.

The chaining was very effective in removing the overstory of juniper and pinyon. However, preferred browse species are almost non-existent following the chaining and seeding. The key browse species are Wyoming big sagebrush and antelope bitterbrush. Together, these species provide less than 5% of the browse cover. Wyoming big sagebrush is currently estimated at only 20 plants/acre, the population being greatly reduced following a fire previous to the 1991 reading. Bitterbrush is currently estimated at 40 plants/acre, down from an estimated 532 plants/acre when the site was first read in 1985. The sagebrush shows light use, while bitterbrush displays heavy use. Both species show good vigor, with no decadent plants being sampled in 1999. The sagebrush population shows the deleterious effects from the fire as well as the prolonged drought throughout much of the 1980's and 1990's. Slenderbush eriogonum was the most abundant browse plant and was lightly utilized in 1985, but this species currently numbers only 60 plants/acre, also with numbers being reduced by fire. These plants are small and do not produce much forage, but currently display moderate use.

The increaser, stickyleaf low rabbitbrush, currently dominates the browse component. This species has increased during each sampling period, especially since the fire, and is currently estimated at 3,660 plant/acre. The population which was all young plants in 1991, now is mostly mature and appears to have a stabile population with low recruitment (5%) and low biotic potential (0%). The average height and crown measurements for low rabbitbrush have more than doubled since 1985. Broom snakeweed is now the second most abundant browse, currently estimated at 1,700 plants/acre. Small clumps of Gambel oak clones occur on the site.

Herbaceous vegetation is diverse, moderately dense, and composed mainly of native species. Several seeded grasses are present, but occur infrequently. These species include: smooth brome, crested wheatgrass, and intermediate wheatgrass. Native grasses are the most abundant with bluebunch wheatgrass, Sandberg bluegrass, mutton bluegrass, and bottlebrush squirreltail all present. Cheatgrass is present at the site and currently occurs in 44% of the quadrats. Forbs are sparse, but fairly diverse and include a few valuable species such as sulfur and redroot eriogonum, tapertip hawksbeard, and hoary aster. The area has been rested from livestock grazing since the chaining.

1985 APPARENT TREND ASSESSMENT

Current soil condition is fairly good and appears stable. Vegetative trend appears upward as the browse recovers from the chaining.

1991 TREND ASSESSMENT

A fire occurred on the area since the 1985 survey. The data showed a loss of almost all the bitterbrush, slenderbush eriogonum, and dwarf rabbitbrush, while low rabbitbrush increased by 63%, and Wyoming big sagebrush decreased by almost 95%. These spectacular changes can all be attributed to the effect of a fire on two species that are especially not tolerant of fire. Almost all grasses have decreased values for both sum of nested and quadrat frequency. Most forbs did have increased sum of nested and quadrat frequency values, but the ones with the highest quadrat frequencies are increasers (fire related), e.g. pale agoseris, thistle, prickly lettuce, and hoary aster. Percent rock cover increased by 68% and percent pavement increased by 56%. Litter cover decreased by 71%. Percent bare ground increased from 9% to 26%. All these findings indicate a downward trend. This trend was surely aggravated by the extended drought, slope, and west aspect.

TREND ASSESSMENT

soil - down

browse - down

herbaceous understory - down

1999 TREND ASSESSMENT

Trend for soil is considered stable to improving. Rock and pavement provide nearly 40% of the surface cover at the present time which armors the surface from heavy erosion. Bare ground and litter cover both decreased in 1999, with vegetative cover increasing. Trend for browse is down. The preferred species, Wyoming big sagebrush and bitterbrush, provide less than 5% of the browse cover, and have not recovered from the fire prior to the 1991 reading. These species have very low densities and recruitment and biotic potential are currently zero. Stickyleaf low rabbitbrush is the dominant species in the chaining. It continues to increase in density and stature. Average height crown measurements have more than doubled since 1985. Broom snakeweed, another increaser, is the second most abundant browse species. Trend for the herbaceous understory is stable. Perennial grasses are the dominate group in the understory providing 35% of the vegetation cover. Sum of nested frequency for perennial grasses and forbs combined increased in 1999.

TREND ASSESSMENT

soil - stable to improving

browse - down

herbaceous understory - stable

HERBACEOUS TRENDS --
Herd unit 25A, Study no: 4

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover % '99
		'85	'91	'99	'85	'91	'99	
G	Agropyron cristatum	_b 22	_b 20	_a 3	9	9	1	.03
G	Agropyron intermedium	_b 46	_a 10	_a 20	23	7	9	.43
G	Agropyron spicatum	_a 68	_a 48	_b 124	28	21	46	3.56
G	Bromus inermis	_a 18	_a 12	_b 80	8	6	28	2.65
G	Bromus tectorum (a)	-	-	110	-	-	44	.90
G	Carex spp.	_b 12	_a -	_{ab} 2	5	-	2	.03
G	Oryzopsis hymenoides	-	-	-	-	-	-	.00
G	Poa fendleriana	58	46	33	28	18	16	.28
G	Poa secunda	_a 9	_a 20	_b 79	3	9	35	1.32
G	Sitanion hystrix	_b 76	_{ab} 42	_a 25	33	22	11	.20
Total for Annual Grasses		0	0	110	0	0	44	0.90
Total for Perennial Grasses		309	198	366	137	92	148	8.53
Total for Grasses		309	198	476	137	92	192	9.44
F	Agoseris glauca	_a 7	_b 29	_{ab} 18	4	15	9	.17
F	Allium spp.	_b 4	_{ab} 5	_a -	3	2	-	-
F	Arabis spp.	-	5	3	-	2	2	.01
F	Astragalus beckwithii	3	8	-	1	4	-	-
F	Astragalus spp.	3	2	3	2	1	1	.00
F	Chaenactis douglasii	4	1	11	3	1	6	.03
F	Cirsium spp.	-	21	40	-	12	18	1.23
F	Collomia linearis (a)	-	-	1	-	-	1	.00
F	Comandra pallida	_{ab} 3	_b 13	_a 1	1	6	1	.00
F	Collinsia parviflora (a)	-	-	9	-	-	3	.01
F	Crepis acuminata	2	4	-	1	2	-	-
F	Cymopterus longipes	3	2	-	2	1	-	-
F	Draba spp. (a)	-	-	6	-	-	3	.04
F	Epilobium brachycarpum (a)	-	-	39	-	-	19	.13
F	Erodium cicutarium (a)	-	3	-	-	1	-	-
F	Erigeron eatonii	-	2	6	-	1	3	.04
F	Erigeron pumilus	_a 8	_{ab} 9	_b 21	4	5	12	.42
F	Eriogonum racemosum	9	15	6	5	8	3	.04
F	Eriogonum umbellatum	_b 19	_a 1	_a 4	10	1	2	.01
F	Gayophytum ramosissimum (a)	-	-	21	-	-	10	.17
F	Lactuca serriola	_a -	_b 64	_a -	-	32	-	-
F	Machaeranthera canescens	_b 50	_b 46	_a 16	20	24	9	.12
F	Microsteris gracilis (a)	-	-	24	-	-	12	.06
F	Petradoria pumila	_a -	_a -	_b 6	-	-	4	.60
F	Phlox longifolia	_a -	_b 35	_a 3	-	16	1	.00

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover % 09
		'85	'91	'99	'85	'91	'99	
F	Polygonum douglasii (a)	-	-	7	-	-	4	.02
F	Ranunculus testiculatus (a)	-	-	8	-	-	3	.01
F	Sphaeralcea coccinea	-	-	3	-	-	2	.03
F	Tragopogon dubius	_a 4	_a 18	_b 61	3	11	29	.67
F	Trifolium spp.	_a 4	_b 21	_a -	2	9	-	-
F	Unknown forb-perennial	-	3	-	-	1	-	-
Total for Annual Forbs		0	3	115	0	1	55	0.46
Total for Perennial Forbs		123	304	202	61	154	102	3.40
Total for Forbs		123	307	317	61	155	157	3.87

Values with different subscript letters are significantly different at $\alpha = 0.10$ (annuals excluded)

BROWSE TRENDS --

Herd unit 25A, Study no: 4

Type	Species	Strip Frequency 09	Average Cover % 09
B	Amelanchier utahensis	0	.00
B	Artemisia tridentata wyomingensis	1	.15
B	Atriplex canescens	0	-
B	Chrysothamnus depressus	3	.03
B	Chrysothamnus nauseosus	3	.18
B	Chrysothamnus viscidiflorus viscidiflorus	55	6.44
B	Echinocereus triglochidatus	0	-
B	Eriogonum microthecum	2	-
B	Gutierrezia sarothrae	33	1.37
B	Pinus edulis	0	-
B	Purshia tridentata	2	.30
B	Quercus gambelii	1	2.03
B	Sambucus cerulea	1	.38
B	Tetradymia canescens	4	.03
Total for Browse		105	10.92

CANOPY COVER --

Herd unit 25A, Study no: 4

Species	Percent Cover 09
Quercus gambelii	1

BASIC COVER --

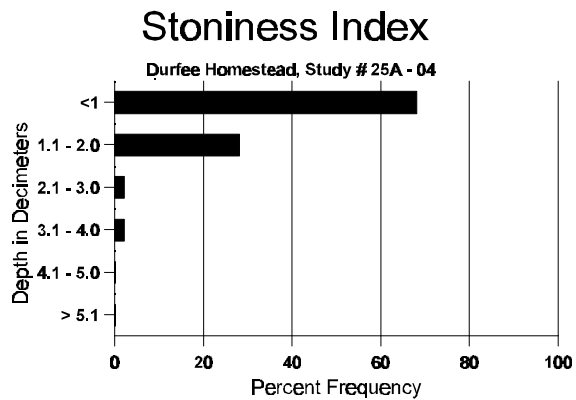
Herd unit 25A, Study no: 4

Cover Type	Nested Frequency 09	Average Cover %		
		'85	'91	'99
Vegetation	313	2.75	6.00	23.77
Rock	315	12.25	38.00	22.90
Pavement	297	3.75	9.00	15.65
Litter	345	72.00	21.00	18.27
Cryptogams	6	.25	0	.01
Bare Ground	297	9.00	26.00	19.98

SOIL ANALYSIS DATA --

Herd Unit 25A, Study # 04, Study Name: Durfee Homestead

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
11.9	58.8 (12.8)	7.5	34.0	38.7	27.3	4.3	38.1	214.4	0.7



PELLET GROUP FREQUENCY --

Herd unit 25A, Study no: 4

Type	Quadrat Frequency 09	Pellet Transect Days Use/Acre (ha) 09
Rabbit	8	n/a
Elk	9	33(82)
Deer	7	15(37)
Cattle	9	16(40)

BROWSE CHARACTERISTICS --

Herd unit 25A, Study no: 4

Field Unit 25A, Study No. 4																			
A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total	
		1	2	3	4	5	6	7	8	9	1	2	3	4					
Amelanchier utahensis																			
S	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
	99	-	-	-	1	-	-	-	-	-	1	-	-	-	20			1	
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20	28	0	
% Plants Showing		<u>Moderate Use</u>				<u>Heavy Use</u>				<u>Poor Vigor</u>				<u>%Change</u>					
'85		00%				00%				00%									
'91		00%				00%				00%									
'99		00%				00%				00%									
Total Plants/Acre (excluding Dead & Seedlings)														'85	0	Dec:	-		
														'91	0		-		
														'99	0		-		
Artemisia tridentata wyomingensis																			
S	85	2	-	-	-	-	-	-	-	-	1	1	-	-	133			2	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
Y	85	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
M	85	2	2	-	-	-	-	-	-	-	4	-	-	-	266	13	14	4	
	91	1	-	-	-	-	-	-	-	-	1	-	-	-	66	11	7	1	
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20	35	53	1	
D	85	6	6	1	-	-	-	-	-	-	8	-	5	-	866			13	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
X	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	20			1	
% Plants Showing		<u>Moderate Use</u>				<u>Heavy Use</u>				<u>Poor Vigor</u>				<u>%Change</u>					
'85		44%				06%				28%				-94%					
'91		00%				00%				00%				-70%					
'99		00%				00%				00%									
Total Plants/Acre (excluding Dead & Seedlings)														'85	1198	Dec:	72%		
														'91	66		0%		
														'99	20		0%		

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Atriplex canescens																		
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0	19	27	0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		00%			00%			00%										
'91		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	0	Dec:	-			
												'91	0		-			
												'99	0		-			
Chrysothamnus depressus																		
S	85	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	85	2	-	-	-	-	-	-	-	-	2	-	-	-	133			2
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	85	10	-	-	-	-	-	-	-	-	10	-	-	-	666	5	8	10
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	99	5	2	-	-	-	-	-	-	-	7	-	-	-	140	5	7	7
D	85	2	-	-	-	-	-	-	-	-	2	-	-	-	133			2
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		00%			00%			00%										
'91		00%			00%			00%										
'99		29%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	932	Dec:	14%			
												'91	0		0%			
												'99	140		0%			
Chrysothamnus nauseosus																		
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	99	3	-	-	-	-	-	-	-	-	3	-	-	-	60	22	32	3
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		00%			00%			00%										
'91		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	0	Dec:	-			
												'91	0		-			
												'99	60		-			

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Chrysothamnus viscidiflorus viscidiflorus																		
S	85	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	91	3	-	-	-	-	-	-	-	-	3	-	-	-	200		3	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	85	4	-	-	-	-	-	-	-	-	4	-	-	-	266		4	
	91	29	2	3	-	-	-	1	-	-	35	-	-	-	2333		35	
	99	10	-	-	-	-	-	-	-	-	9	-	1	-	200		10	
M	85	9	-	-	-	-	-	-	-	-	9	-	-	-	600	6 7	9	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	- -	0	
	99	142	-	-	-	-	-	-	-	-	142	-	-	-	2840	15 22	142	
D	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	25	2	-	4	-	-	-	-	-	18	-	-	13	620		31	
X	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	40		2	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		00%			00%			00%			+63%							
'91		06%			09%			00%			+36%							
'99		01%			00%			08%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	866	Dec:	0%			
												'91	2333		0%			
												'99	3660		17%			
Echinocereus triglochidatus																		
Y	85	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		00%			00%			00%										
'91		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	66	Dec:	-			
												'91	0		-			
												'99	0		-			

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Eriogonum microthecum																		
Y	85	9	-	-	-	-	-	-	-	-	9	-	-	-	600		9	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	85	13	2	1	-	-	-	-	-	-	14	2	-	-	1066	7	7	16
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	99	-	3	-	-	-	-	-	-	-	3	-	-	-	60	3	13	3
D	85	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		08%			04%			00%										
'91		00%			00%			00%										
'99		100%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	1732	Dec:		4%		
												'91	0			0%		
												'99	60			0%		
Gutierrezia sarothrae																		
S	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
Y	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	4	-	-	-	-	1	-	-	-	5	-	-	-	100			5
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	99	80	-	-	-	-	-	-	-	-	80	-	-	-	1600	8	11	80
X	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	20			1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		00%			00%			00%										
'91		00%			00%			00%										
'99		00%			01%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	0	Dec:		-		
												'91	0			-		
												'99	1700			-		

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Pinus edulis																		
Y	85	1	-	-	-	-	-	-	-	-	-	-	1	-	66		1	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
D	85	1	-	-	-	-	-	-	-	-	-	-	1	-	66		1	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		00%			00%			100%										
'91		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	132	Dec:	50%			
												'91	0		0%			
												'99	0		0%			
Purshia tridentata																		
Y	85	1	1	-	-	-	-	-	-	-	2	-	-	-	133		2	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	85	2	2	1	-	-	-	-	-	-	5	-	-	-	333	15	25	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	99	-	-	1	-	-	1	-	-	-	2	-	-	-	40	20	48	
D	85	-	1	-	-	-	-	-	-	-	1	-	-	-	66		1	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		50%			13%			00%										
'91		00%			00%			00%										
'99		00%			100%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	532	Dec:	12%			
												'91	0		0%			
												'99	40		0%			
Quercus gambelii																		
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	99	13	-	-	-	-	-	-	-	-	13	-	-	-	260	69	69	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		00%			00%			00%										
'91		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	0	Dec:	-			
												'91	0		-			
												'99	260		-			

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Sambucus cerulea																		
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	99	1	-	-	-	-	-	-	-	-	-	1	-	-	20	43	52	1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
		'85			00%			00%			00%							
		'91			00%			00%			00%							
		'99			00%			00%			00%							
Total Plants/Acre (excluding Dead & Seedlings)												'85		0	Dec:	-		
												'91		0		-		
												'99		20		-		
Tetradymia canescens																		
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	99	4	1	-	-	-	-	-	-	-	-	5	-	-	100	6	14	5
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
		'85			00%			00%			00%							
		'91			00%			00%			00%							
		'99			20%			00%			00%							
Total Plants/Acre (excluding Dead & Seedlings)												'85		0	Dec:	-		
												'91		0		-		
												'99		100		-		

Trend Study 25A-5-99

Study site name: Praetor Slope.

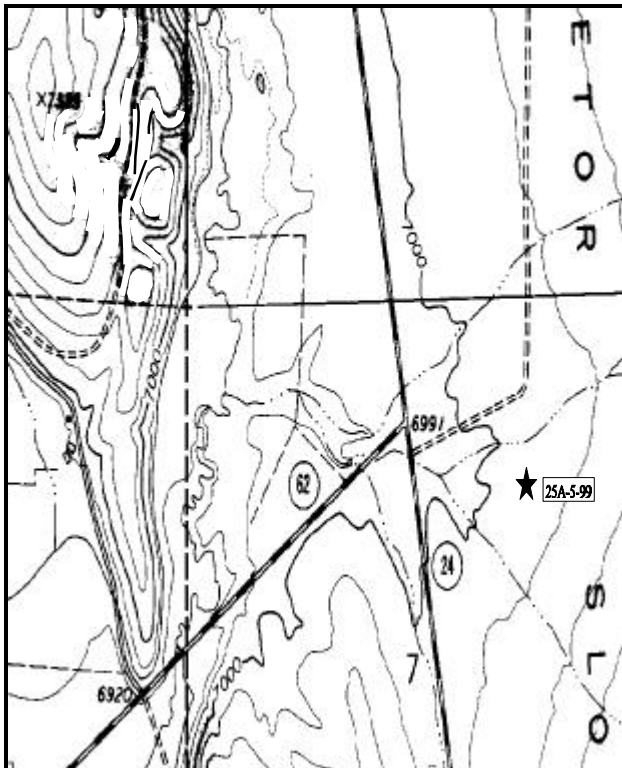
Range type: Big Sagebrush-Grass.

Compass bearing: frequency baseline 163°M.

Footmark (first frame at) 5 feet, footmarks (frequency belts) line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

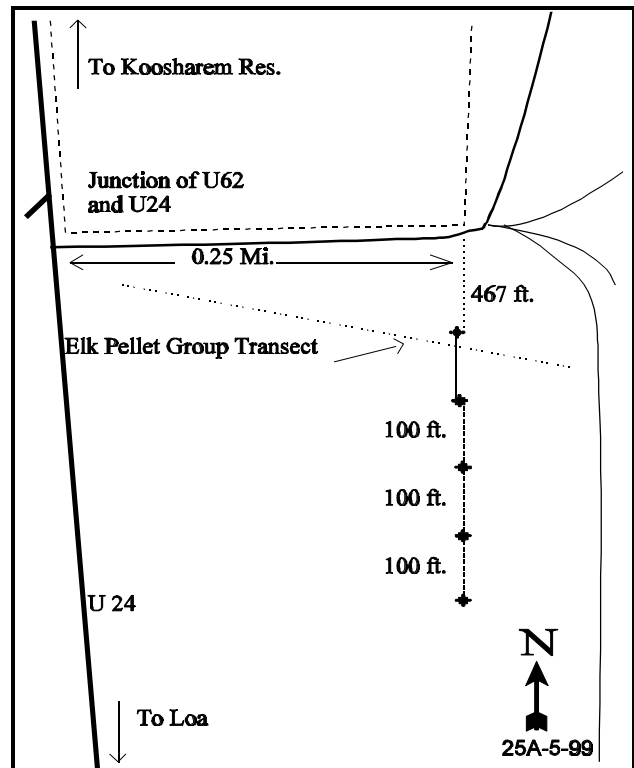
LOCATION DESCRIPTION

From the junction of U-62 and U-24 south of Koosharem Reservoir, proceed south for 25 yards and turn left onto a dirt road. Go through the gate and up the road 0.25 miles to where the road turns at the fence corner. Walk 467 feet due south from the fence corner to the top of a small rise. The baseline starts here, and is marked by a 5' steel rebar.



Map Name: Burrville, Utah

Township 26S, Range 1E, Section 7



Diagrammatic Sketch

UTM 4268970.250 N, 427256.874 E

DISCUSSION

Trend Study No. 25A-5 (43-5)

The Praetor Slope trend study surveys deer and elk winter range on BLM land south of Koosharem Reservoir. This is an area of 1,440 acres that was chained and seeded in 1964. The study is located at an elevation of about 7,000 feet on the east side of Plateau Valley. The aspect is west with a gentle slope of 1-2%. Average yearly precipitation is low, with just over 9 inches measured at Koosharem (elevation 6,900 feet, 3 miles southwest). The transect is 300 yards from state highway U-24. The area is a sheep allotment with use scheduled from either June 1 to June 30 (600 sheep) or October 25 through November 15 (1,400 sheep) on a rotating basis. Animal use is currently low with an estimated 12 deer days use/acre (30 ddu/ha) and 22 sheep days use/acre (56 sdu/ha) from pellet transect data taken in 1999. Elk do not appear to be using the area at the present time with only 1 pellet group sampled in 1999.

Although rocky throughout the profile, the soil is fairly deep with an estimated effective rooting depth of nearly 18 inches. The soil is a loam in texture and has a slightly alkaline pH (7.6). Organic matter is relatively low at 1.7%, with most of the litter present under the sagebrush crowns. Bare ground is currently ('99) low at 11%, while pavement and rock cover combined are high at 42%. Erosion is not severe with the gentle slope and relatively high cover from crested wheatgrass.

Wyoming big sagebrush dominates the site. It currently provides all of the browse cover, and 42% of the total vegetation cover. With the extension of the baseline in 1999, the population density is currently estimated at 4,420 plants/acre. The plants are short in stature, with the majority of the plants being moderate to heavily hedged in all 3 sampling years. Plants were noted as having poor leader growth in 1991. Vigor improved in 1999, with those plants displaying poor vigor decreasing from 24% to 11%. Percent decadency which was high in 1991 (52%), has since then decreased to 30% in 1999, which is average for most big sagebrush. The proportion of the decadent plants that are classified as dying decreased from 43% in 1991, to 36% in 1999. The population appears stable as 68% of the plants are mature, although recruitment is poor. The only other browse species present in the area are a few pricklypear cactus, and a population of rubber rabbitbrush in the bottom of a wash. There is no protective cover for wildlife near the transect.

Crested wheatgrass makes up almost all of the understory on the Praetor Slope transect. It is found in all of the quadrats, and provides over half of all the vegetation cover at the site. The only other grass sampled in 1999 was Letterman needle grass which was found in only a single quadrat. Crested wheatgrass is vigorous and showed some utilization in 1999. Forbs are scarce with the annual bur buttercup the only species sampled in 1999.

1985 APPARENT TREND ASSESSMENT

Overall range trend appears stable. Erosion of the top soil and along trails has occurred, but appears to have stabilized with a high percentage of pavement on the surface. Continuous spring grazing pressure has most likely depleted the desirable native perennial grasses and forbs. At present, the vegetative composition is simple, but both sagebrush and crested wheatgrass are vigorous and producing well. As long as care is taken to protect against overgrazing by livestock in the spring, current management is probably adequate to maintain the range in fair condition.

1991 TREND ASSESSMENT

The trend for soil is stable to slightly down with an increase in percent bare soil and a decrease in percent litter cover. Sagebrush density has gone down (32%) and decadency has increased from 8 to 52%. The high sagebrush densities, competition with itself, and the extended drought have been the main reason for this increase in percent decadency. Another problem with the area is the low average annual precipitation (effect

of a rain shadow) even with a relatively high elevation of 6,900 feet. The herbaceous understory is made up of basically one species, crested wheatgrass which appears to be stable at this time.

TREND ASSESSMENT

soil - stable to slightly downward

browse - declining

herbaceous understory - stable, but poor composition (basically a monoculture)

1999 TREND ASSESSMENT

Trend for soil is stable. Bare ground and litter cover both decreased, with rock and pavement cover increasing. Erosion is minimal at the site due to the gentle slope and high cover from crested wheatgrass. Trend for browse is stable. The population of Wyoming big sagebrush has declined slightly since 1991, however much of the change is because the sample size for browse has more than tripled and now gives significantly better estimates for browse which usually has discontinuous and/or clumped distributions. More importantly, now the population shows a significantly lower percent decadency, lower proportion of decadent plants classified as dying, and improved vigor. Use remains moderate to heavy on the majority of the population. Trend for the herbaceous understory is stable, but lacking in diversity. Crested wheatgrass is overly dominant with other grasses and forbs being scarce.

TREND ASSESSMENT

soil - stable

browse - stable

herbaceous understory - stable

HERBACEOUS TRENDS --

Herd unit 25A, Study no: 5

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover % '99
		'85	'91	'99	'85	'91	'99	
G	Agropyron cristatum	_b 329	_{ab} 316	311	99	100	100	16.31
G	Sitanion hystrix	1	2	-	1	1	-	-
G	Stipa lettermani	-	3	1	-	1	1	.00
Total for Annual Grasses		0	0	0	0	0	0	0
Total for Perennial Grasses		330	321	312	100	102	101	16.31
Total for Grasses		330	321	312	100	102	101	16.31
F	Antennaria rosea	_b 5	_a -	_a -	3	-	-	-
F	Arabis spp.	-	1	-	-	1	-	-
F	Astragalus beckwithii	-	4	-	-	2	-	-
F	Astragalus spp.	_{ab} 6	_b 10	_a -	2	4	-	-
F	Erigeron spp.	6	3	-	2	1	-	-
F	Eriogonum spp.	-	1	-	-	1	-	-
F	Phlox longifolia	_a -	_b 57	_a -	-	28	-	-
F	Ranunculus testiculatus (a)	-	-	29	-	-	10	.15
F	Trifolium spp.	_b 18	_b 33	_a -	10	17	-	-

T y p e	Species	Nested Frequency			Quadrat Frequency			Average Cover % 09
		'85	'91	'99	'85	'91	'99	
	Total for Annual Forbs	0	0	29	0	0	10	0.15
	Total for Perennial Forbs	35	109	0	17	54	0	0
	Total for Forbs	35	109	29	17	54	10	0.15

Values with different subscript letters are significantly different at % = 0.10 (annuals excluded)

BROWSE TRENDS --

Herd unit 25A, Study no: 5

T y p e	Species	Strip Frequency 09	Average Cover % 09
B	Artemisia tridentata wyomingensis	90	12.08
B	Atriplex canescens	0	-
B	Opuntia spp.	0	-
	Total for Browse	90	12.08

BASIC COVER --

Herd unit 25A, Study no: 5

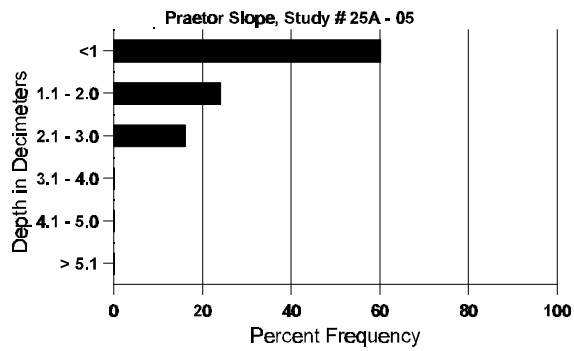
Cover Type	Nested Frequency 09	Average Cover %		
		'85	'91	'99
Vegetation	314	4.75	4.75	25.31
Rock	286	5.00	13.25	12.26
Pavement	348	24.50	17.75	29.79
Litter	346	44.75	37.00	21.65
Cryptogams	63	0	0	1.10
Bare Ground	272	21.00	27.25	11.23

SOIL ANALYSIS DATA --

Herd Unit 25A, Study # 05, Study Name: Praetor Slope

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
17.8	57.2 (14.9)	7.6	36.0	39.1	24.9	1.7	14.7	361.6	0.9

Stoniness Index



PELLET GROUP FREQUENCY --

Herd unit 25A, Study no: 5

Type	Quadrat Frequency 09	Pellet Transect Days Use/Acre (ha) 09
Sheep	8	21(52)
Rabbit	66	n/a
Elk	1	0
Deer	12	12(30)
Cattle	1	0

BROWSE CHARACTERISTICS --

Herd unit 25A, Study no: 5

A G R E	Y	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Artemisia tridentata wyomingensis																		
S	85	11	-	-	-	-	-	-	-	-	11	-	-	-	733		11	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	85	17	26	10	-	-	-	-	-	-	49	-	4	-	3533		53	
	91	2	-	-	1	1	-	-	-	-	3	1	-	-	266		4	
	99	3	-	-	-	-	-	-	-	-	3	-	-	-	60		3	
M	85	-	20	41	-	-	-	-	-	-	60	-	1	-	4066	17	21	
	91	4	17	3	4	7	1	-	-	-	34	1	1	-	2400	16	18	
	99	13	96	35	1	3	3	-	-	-	150	1	-	-	3020	21	28	
D	85	-	2	8	-	-	-	-	-	-	7	-	3	-	666		10	
	91	10	27	3	1	3	-	-	-	-	25	-	-	19	2933		44	
	99	16	34	9	-	5	3	-	-	-	43	-	-	24	1340		67	
X	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	540		27	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		39%			48%			06%			-32%							
'91		65%			08%			24%			-21%							
'99		62%			23%			11%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	8265	Dec:	8%			
												'91	5599		52%			
												'99	4420		30%			
Atriplex canescens																		
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0	9	12	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		00%			00%			00%										
'91		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	0	Dec:	-			
												'91	0		-			
												'99	0		-			
Opuntia spp.																		
M	85	1	-	-	-	-	-	-	-	-	1	-	-	-	66	6	9	
	91	1	-	-	-	-	-	-	-	-	1	-	-	-	66	2	2	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		00%			00%			00%			+ 0%							
'91		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	66	Dec:	-			
												'91	66		-			
												'99	0		-			

Trend Study 25A-7-99

Study site name: Evans Reservoir .

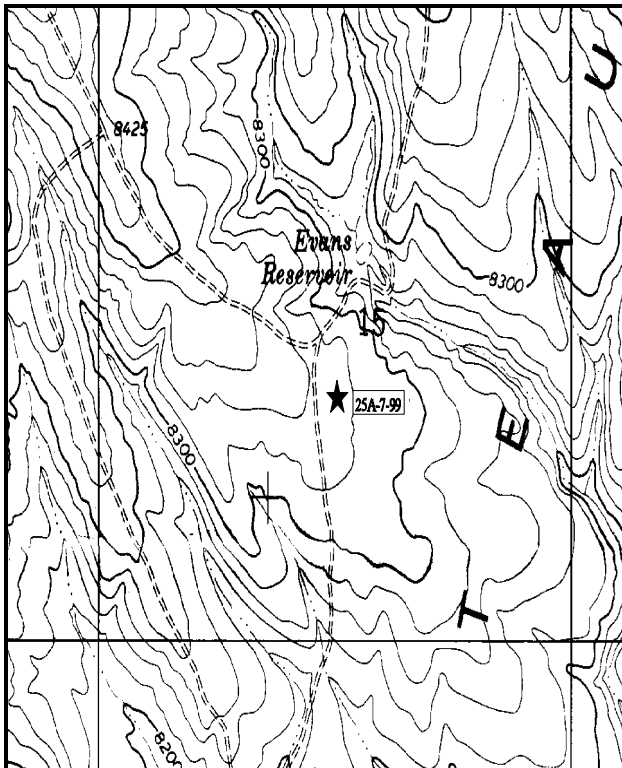
Range type: Big Sagebrush-Grass .

Compass bearing: frequency baseline 180°M.

Footmark (first frame at) 5 feet, footmarks (frequency belts) line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

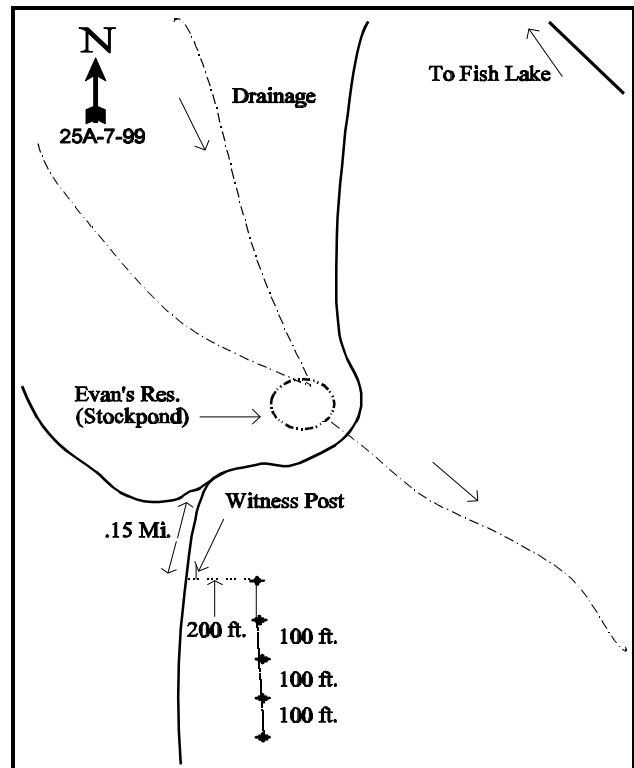
LOCATION DESCRIPTION

Heading northwest out of Loa on U-24, turn right at mile marker 45. Go 3.5 miles to a green and yellow fence post on the left (20 feet off the road). Continue about 0.1 miles past the fence post and turn left. Go 1.55 miles past a stock pond and up to a fork. Turn left at the fork and go 0.15 miles to a steel rebar witness post on the left side of the road. From the witness post, walk 200 feet east to the 0-foot baseline stake, a rebar with browse tag #7122.



Map Name: Abes Knoll, Utah

Township 27S , Range 1E , Section 15



Diagrammatic Sketch

UTM 4256930.133 N, 431156.974 E

DISCUSSION

Trend Study No. 25A-7 (44-1)

The Evans Reservoir study is located on one of the open rolling ridges of the Awapa Plateau at an elevation of 8,300 feet. The transect is on a relatively flat ridge top within a sagebrush-grass community with a slope of about 6% and a northeast aspect. Pipe harrow treatments were done in the past to many large tracks of sagebrush near the site. A portion of the first 100 feet of the transect had been pipe harrowed when the transect was read in 1999. Sheep graze the area in the spring and fall. Wildlife use is predominately pronghorn antelope, although mule deer will use the site during some winters. Both antelope and sage grouse were observed in the area in 1991. Elk use appears to be increasing as 51 elk days use/acre were estimated from the pellet transect data in 1999. Deer and antelope use combined is currently estimated at 16 days use/acre (40 days use/ha) with most of this probably coming from antelope. The pellets from these two species were difficult to distinguish differences. Sage grouse droppings were also encountered in 1999. Rabbit use is high in the area as well with over 200 groups sampled in 1999. Evans Reservoir, a small stock pond located 1/4 mile to the north, is an important water source for the area.

Soils are densely compacted and quite shallow with an estimated effective rooting depth of only 9 inches. Texture is a sandy loam with a neutral pH (7.1). Organic matter is low at 1.7%. Phosphorus (8.8 ppm) is slightly lower than the 10 ppm minimum shown necessary for normal plant growth and development. A calcium carbonate layer is present within the profile at about 10 inches below the surface, which could be restrictive to root development. The vegetation is widely dispersed, with little bare soil sampled in 1985. By 1991, bare soil was estimated at 23% which is probably an overestimation as bare ground dropped to 11% in 1999. Pavement cover has been high in all years, currently estimated at 25%. Vegetation and litter cover together provide 60% of the cover at the site. There is some evidence of wind erosion and wind-scoured depressions, with slight pedestaling occurring around the base of sagebrush.

Browse composition is dominated by a mix of mountain big sagebrush and black sagebrush. Mountain big sagebrush currently contributes to 57% of the browse cover. It had a moderately high density estimated at 6,266 plants/acre in 1985, 4,732 plants/acre in 1991, and 4,360 plants/acre in 1999. The mountain big sagebrush has shown moderate to heavy use in all three sampling years, however vigor has generally been generally good. Percent decadency is high at 53% in 1999, an increase from 28% in 1991. Much of this decadency is due to plants that were pipe harrowed on the first belt of the sampling transect. Presently, 25% of the decadent plants are classified as dying, a decrease from 60% in 1991. The current age structure points to a declining population with high decadency, and more decadent dying plants than young or seedlings to replace them. Leader growth on mountain big sagebrush varied from 4 to 8 inches in 1999. Black sagebrush is second in abundance to mountain big sagebrush, and is currently estimated at 4,140 plants/acre. This represents a 36% increase from the 1991 estimate. Much of this difference would be due to the extension of the baseline in 1999 accompanying the new methods which has increased the sample size for browse by a factor of more than three times. However, this gives significantly more accurate measurements for discontinuous distributions of browse like black sagebrush. Black sagebrush consists mostly of mature (51%) and decadent plants (43%), with 56% of the decadent plants classified as dying. The current decadency rate is actually the lowest since the transect was established in 1985. Use is mostly light to moderate, with poor vigor displayed on 23% and 24% of the population respectively in 1991 and 1999. Recruitment and biotic potential are currently relatively low for black sagebrush.

Perennial native grasses dominate the understory by providing 42% of the total vegetation cover at the site. Currently, muttongrass and bluebunch wheatgrass are the most abundant. Bluebunch wheatgrass significantly increased in sum of nested frequency in 1999, while muttongrass slightly decreased. Other species include: pinewoods needlegrass, blue grama, bottlebrush squirreltail, and a Carex. The grasses had received little use when the site was read in August 1999. Grasses make up a small percentage of the diet of antelope in Utah except during the new flush of growth each spring.

The forbs observed are quite diverse, but with low quadrat frequencies. Antelope are known to utilize some of these in summer, especially *Astragalus sp.*, *Lotus sp.*, *Eriogonum racemosum*, and *Linum lewisii* (Smith and Beale 1980). Smith and Beale (1980) also thought that antelope on the Awapa Plateau may feed on the abundant lichens. The most abundant forbs are timber poisonvetch and desert phlox which currently provide 73% of the forb cover.

1985 APPARENT ASSESSMENT OF TREND

Soil trend appears stable. There is little erosion because of the pavement and litter cover. The data indicate a downward vegetative trend. There are few young or seedlings in the mountain big sagebrush or black sagebrush populations with their form and vigor appearing to decline. Several increaser species, narrowleaf low rabbitbrush, broom snakeweed, pricklypear cactus, and desert phlox are present in rather low numbers, although they could increase with a decline of the sagebrush population. The grasses appear stable.

1991 TREND ASSESSMENT

Soil trend appears to be declining. Pavement and rock cover declined from 55% to 37%, while cover for bare ground increased from 8% to 23%. Litter cover increased slightly. The key browse species, mountain big sagebrush, did decrease in density since 1985 by 24%, while percent decadency decreased from 47% to 28%. However, 60% of the decadent plants (1,333 plants/acre) were classified as dying. The percentage of the population in the young and mature age classes improved respectively from 3% to 10% and 50% to 62%. Another important aspect of this population is that with the decrease in density which was already too high, shrub size for mature plants has increased for both width and height. The effective volume of each plant, on average, has almost doubled. Trend for browse would be considered slightly down. The herbaceous understory trend is improved. Bluebunch wheatgrass was not even recorded in 1985, but it now has a quadrat frequency of 27%. Mutton bluegrass, bottlebrush squirreltail, and pinewoods needlegrass have increased also. They had quadrat frequency changes respectively of 63% to 76%, 28% to 50%, and 39% to 68%. Most of the forbs also had increasing quadrat sum of frequency values.

TREND ASSESSMENT

soil - declining

browse - slightly downward

herbaceous understory - slightly improved

1999 TREND ASSESSMENT

Trend for soil is stable to slightly improved. Vegetation and litter cover combined provide more than 60% of the cover. Bare ground is low at 11%, with pavement is high at 25%. Erosion is minimal with the gentle slope. Trend for the key browse is slightly down. Mountain big sagebrush looks to decrease in the future with a high rate of decadent plants (53%), and more decadent dying plants than young in the population. Use continues to be moderate to heavy. Black sagebrush also shows high decadency at 43%, with 56% of these classified as dying. Nearly one-fourth of the population displays poor vigor. Recruitment and biotic potential of black sagebrush are low. Trend for the herbaceous understory is slightly down. Sum of nested frequency for perennial grasses and forbs decreased by 17% in 1999.

TREND ASSESSMENT

soil - stable to slightly improved

browse - slightly down

herbaceous understory - slightly down

HERBACEOUS TRENDS --
Herd unit 25A, Study no: 7

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover % '99
		'85	'91	'99	'85	'91	'99	
G	Agropyron spicatum	_a 2	_b 51	_c 127	1	27	54	4.24
G	Bouteloua gracilis	37	40	50	18	16	23	.65
G	Carex spp.	_{ab} 6	_a 4	_b 18	5	2	10	.56
G	Oryzopsis hymenoides	_a -	_{ab} 2	_b 7	-	2	3	.33
G	Poa fendleriana	_a 136	_b 168	_{ab} 139	63	76	60	4.73
G	Poa secunda	_b 44	_a 16	_a 10	20	8	4	.09
G	Sitanion hystrix	_b 62	_c 119	_a 25	28	50	15	.71
G	Stipa comata	_a -	_a -	_b 5	-	-	4	.21
G	Stipa pinetorum	_a 81	_b 142	_a 97	39	68	40	1.47
Total for Annual Grasses		0	0	0	0	0	0	0
Total for Perennial Grasses		368	542	478	174	249	213	13.02
Total for Grasses		368	542	478	174	249	213	13.02
F	Androsace septentrionalis (a)	-	-	29	-	-	13	.19
F	Arabis demissa	_b 62	_a 19	_a 3	30	11	1	.00
F	Astragalus convallarius	_a 6	_a 14	_b 71	4	8	34	2.23
F	Aster spp.	-	1	-	-	1	-	-
F	Astragalus spp.	1	-	-	1	-	-	-
F	Castilleja chromosa	_a -	_b 5	_a -	-	3	-	-
F	Chaenactis douglasii	_a -	_b 3	_b 8	-	3	4	.02
F	Comandra pallida	-	-	4	-	-	2	.06
F	Cryptantha spp.	_b 58	_b 68	_a 17	30	36	7	.25
F	Eriogonum alatum	-	-	2	-	-	1	.00
F	Erigeron pumilus	3	1	5	1	1	2	.01
F	Eriogonum racemosum	-	-	1	-	-	1	.01
F	Eriogonum umbellatum	14	11	10	6	7	4	.21
F	Lactuca serriola	-	3	-	-	1	-	-
F	Linum lewisii	_a 1	_a 17	_b 29	1	7	14	.30
F	Lotus utahensis	_c 55	_a -	_b 16	26	-	9	.36
F	Phlox austromontana	_a 67	_b 130	_a 101	30	61	44	1.83
F	Phlox longifolia	_b 9	_b 19	_a -	5	9	-	-
F	Sanguisorba minor	_b 6	_a -	_a -	5	-	-	-
F	Senecio multilobatus	_a 3	_b 61	_a 6	1	31	4	.05
F	Streptanthus cordatus	_a -	_b 5	_a -	-	3	-	-
F	Trifolium spp.	_a -	_c 13	_b 5	-	9	3	.01
F	Unknown forb-perennial	_b 20	_a -	_a -	10	-	-	-
F	Zigadenus paniculatus	2	-	-	1	-	-	-
Total for Annual Forbs		0	0	29	0	0	13	0.19

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover %
		'85	'91	'99	'85	'91	'99	
	Total for Perennial Forbs	307	370	278	151	191	130	5.38
	Total for Forbs	307	370	307	151	191	143	5.57

Values with different subscript letters are significantly different at $\alpha = 0.10$ (annuals excluded)

BROWSE TRENDS --

Herd unit 25A, Study no: 7

Type	Species	Strip Frequency	Average Cover %
		'99	'99
B	Artemisia nova	65	6.79
B	Artemisia tridentata vaseyana	85	9.89
B	Chrysothamnus viscidiflorus viscidiflorus	30	.46
B	Coryphantha vivipara	1	-
B	Eriogonum corymbosum	1	.03
B	Eriogonum microthecum	3	.06
B	Gutierrezia sarothrae	1	-
B	Leptodactylon pungens	18	.09
B	Opuntia spp.	1	-
B	Symphoricarpos oreophilus	0	-
	Total for Browse	205	17.33

BASIC COVER --

Herd unit 25A, Study no: 7

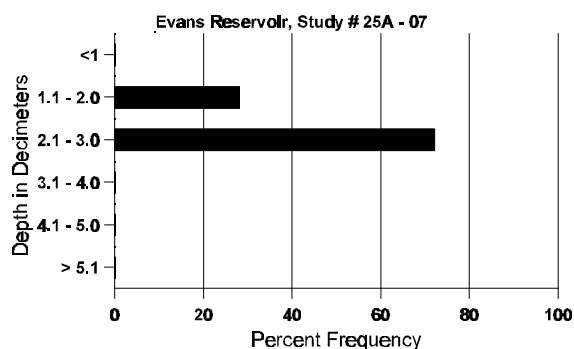
Cover Type	Nested Frequency	Average Cover %		
		'85	'91	'99
Vegetation	306	11.00	8.75	35.34
Rock	96	0	4.00	1.35
Pavement	325	54.75	33.00	25.01
Litter	341	26.25	30.25	25.26
Cryptogams	12	.50	1.00	.08
Bare Ground	245	7.50	23.00	10.93

SOIL ANALYSIS DATA --

Herd Unit 25A, Study # 07, Study Name: Evans Reservoir

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
9.3	57.0 (9.0)	7.1	59.3	21.4	19.3	1.7	8.8	217.6	1.2

Stoniness Index



PELLET GROUP FREQUENCY --

Herd unit 25A, Study no: 7

Type	Quadrat Frequency 09	Pellet Transect Days Use/Acre (ha) 09
Rabbit	45	n/a
Elk	38	51(126)
Deer	5	16(40)
Antelope	1	0

BROWSE CHARACTERISTICS --

Herd unit 25A, Study no: 7

Field Unit 257A, Study No. 7																		
A Y G R E	Y	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Artemisia nova																		
S	85	3	-	-	-	-	-	-	-	-	3	-	-	-	200		3	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	3	-	-	1	-	-	-	-	-	4	-	-	-	80		4	
Y	85	2	-	-	-	-	-	-	-	-	2	-	-	-	133		2	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	8	3	-	1	-	-	-	-	-	12	-	-	-	240		12	
M	85	4	10	7	-	-	-	-	-	-	21	-	-	-	1400	10 9	21	
	91	6	14	-	1	-	-	-	-	-	21	-	-	-	1400	8 16	21	
	99	49	51	3	-	2	-	-	-	-	105	-	-	-	2100	11 19	105	
D	85	-	10	23	-	-	-	-	-	-	27	-	-	6	2200		33	
	91	3	16	-	-	-	-	-	-	-	10	-	-	9	1266		19	
	99	48	29	-	3	7	-	3	-	-	40	-	-	50	1800		90	
X	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	320		16	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		36%			54%			11%			-29%							
'91		75%			00%			23%			+36%							
'99		44%			01%			24%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	3733	Dec:	59%			
												'91	2666		47%			
												'99	4140		43%			

A G R E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Artemisia tridentata vaseyana																		
S	85	8	-	-	-	-	-	-	-	-	8	-	-	-	533		8	
	91	-	-	-	-	-	-	4	-	-	4	-	-	-	266		4	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	85	3	-	-	-	-	-	-	-	-	3	-	-	-	200		3	
	91	7	-	-	-	-	-	-	-	-	7	-	-	-	466		7	
	99	14	8	-	-	-	-	-	-	-	22	-	-	-	440		22	
M	85	11	35	1	-	-	-	-	-	-	44	-	3	-	3133	15 21	47	
	91	2	22	20	-	-	-	-	-	-	44	-	-	-	2933	18 26	44	
	99	14	54	10	1	1	-	-	-	-	76	2	2	-	1600	17 29	80	
D	85	6	29	9	-	-	-	-	-	-	39	-	3	2	2933		44	
	91	1	12	4	-	1	-	2	-	-	8	-	-	12	1333		20	
	99	29	71	10	2	1	1	2	-	-	86	-	1	29	2320		116	
X	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	580		29	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		68%			11%			09%			-24%							
'91		49%			34%			17%			- 8%							
'99		62%			10%			15%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	6266	Dec:	47%			
												'91	4732		28%			
												'99	4360		53%			
Chrysothamnus viscidiflorus viscidiflorus																		
S	85	2	-	-	-	-	-	-	-	-	2	-	-	-	133		2	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	-	1	-	-	-	-	1	-	-	2	-	-	-	133		2	
	99	4	-	-	1	-	-	-	-	-	5	-	-	-	100		5	
M	85	11	-	-	-	-	-	-	-	-	11	-	-	-	733	5 4	11	
	91	-	-	-	-	-	-	2	-	-	2	-	-	-	133	5 6	2	
	99	52	-	-	1	-	-	-	-	-	53	-	-	-	1060	8 10	53	
D	85	5	-	-	-	-	-	-	-	-	4	-	1	-	333		5	
	91	-	-	1	-	-	-	-	-	-	-	-	-	1	66		1	
	99	-	-	-	2	-	-	1	-	-	3	-	-	-	60		3	
X	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		00%			00%			06%			-69%							
'91		20%			20%			20%			+73%							
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	1066	Dec:	31%			
												'91	332		20%			
												'99	1220		5%			

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Coryphantha vivipara																		
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	99	1	-	-	-	-	-	-	-	-	-	1	-	-	20	2	4	1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
		'85			00%			00%			00%							
		'91			00%			00%			00%							
		'99			00%			00%			00%							
Total Plants/Acre (excluding Dead & Seedlings)												'85	0	Dec:	-			
												'91	0		-			
												'99	20		-			
Eriogonum corymbosum																		
Y	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	-	-	-	1	-	-	-	-	-	-	1	-	-	20			1
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	99	1	-	-	-	-	-	-	-	-	-	1	-	-	20	7	6	1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
		'85			00%			00%			00%							
		'91			00%			00%			00%							
		'99			00%			00%			00%							
Total Plants/Acre (excluding Dead & Seedlings)												'85	0	Dec:	-			
												'91	0		-			
												'99	40		-			
Eriogonum microthecum																		
Y	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	1	-	-	1	-	-	-	-	2	-	-	-	133			2
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	85	6	-	-	-	-	-	-	-	-	6	-	-	-	400	7	5	6
	91	-	1	1	-	1	1	1	-	-	5	-	-	-	333	5	7	5
	99	3	1	-	-	-	-	-	-	-	4	-	-	-	80	4	4	4
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
		'85			00%			00%			+14%							
		'91			57%			29%			-83%							
		'99			25%			00%			00%							
Total Plants/Acre (excluding Dead & Seedlings)												'85	400	Dec:	-			
												'91	466		-			
												'99	80		-			

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Gutierrezia sarothrae																		
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	99	1	-	-	-	-	-	-	-	-	-	1	-	-	20	3	7	1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
		'85			00%			00%			00%							
		'91			00%			00%			00%							
		'99			00%			00%			00%							
Total Plants/Acre (excluding Dead & Seedlings)												'85	0	Dec:	-			
												'91	0		-			
												'99	20		-			
Leptodactylon pungens																		
Y	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	-	-	-	2	-	-	-	-	-	-	2	-	-	40			2
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	99	27	-	-	1	-	-	-	-	-	-	28	-	-	560	6	7	28
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
		'85			00%			00%			00%							
		'91			00%			00%			00%							
		'99			00%			00%			00%							
Total Plants/Acre (excluding Dead & Seedlings)												'85	0	Dec:	-			
												'91	0		-			
												'99	600		-			
Opuntia spp.																		
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	99	1	-	-	-	-	-	-	-	-	-	1	-	-	20	5	13	1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
		'85			00%			00%			00%							
		'91			00%			00%			00%							
		'99			00%			00%			00%							
Total Plants/Acre (excluding Dead & Seedlings)												'85	0	Dec:	-			
												'91	0		-			
												'99	20		-			
Symphoricarpos oreophilus																		
Y	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	1	-	-	-	1	-	-	66			1
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
		'85			00%			00%			00%							
		'91			00%			00%			00%							
		'99			00%			00%			00%							
Total Plants/Acre (excluding Dead & Seedlings)												'85	0	Dec:	-			
												'91	66		-			
												'99	0		-			

Trend Study 25A-8-99

Study site name: Lower Dog Flat.

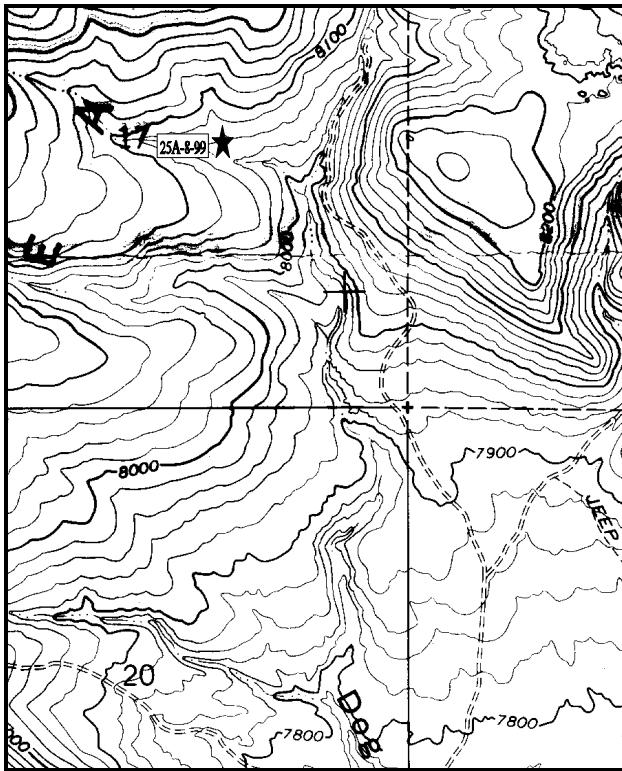
Range type: Chained, Cabled, Seeded P-J.

Compass bearing: frequency baseline 165°M.

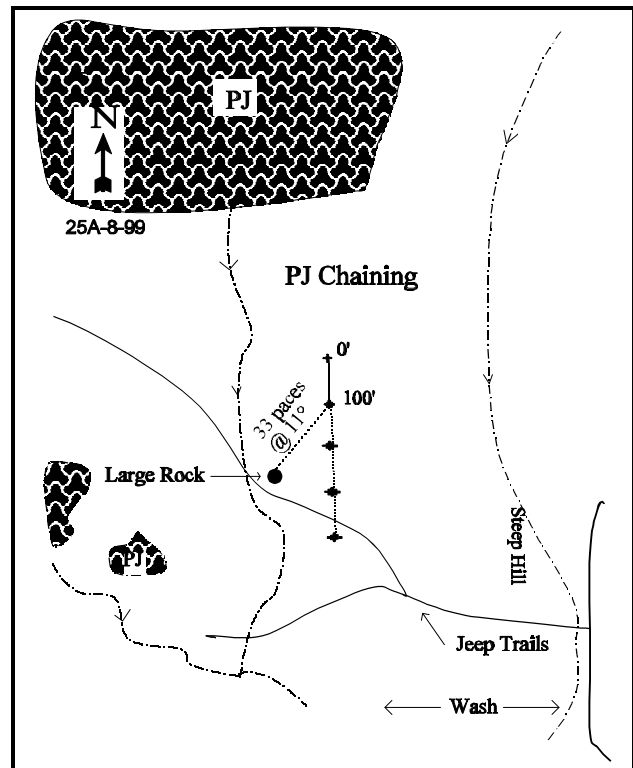
Footmark (first frame at) 5feet, footmarks (frequency belts) line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

LOCATION DESCRIPTION

From Loa, go 3.8 miles northwest on U-24 (0.9 miles beyond mile marker 49). Turn right (north) on a gravel road and proceed 0.7 miles. Just beyond the cattleguard turn right and go another 0.7 miles. Turn left just before another cattleguard and go 0.9 miles. At the bottom of the hill, a road forks off to the left, through a wash, up a steep hill and west into the chaining. Take this road 0.2 miles and stop at a 3' rebar post on the right side of the road marking the 300' stake of the baseline. The 0-foot baseline stake is marked by browse tag #7188.

Map Name: Loa, Utah

Township 27S, Range 2E, Section 17



Diagrammatic Sketch

UTM 4257278.018 N, 437852.724 E

DISCUSSION

Trend Study No. 25A-8 (44-2)

The Lower Dog Flat study is located on a 2-5% south facing slope at an elevation of 8,100 feet on the eastern side of the Awapa Plateau. The area was once covered by pinyon pine, but was chained in 1980 effectively eliminating the trees. Most of the mountain big sagebrush survived. Sagebrush and broom snakeweed are now the principal species. Establishment of seeded species was erratic and native species are still the most prominent. The land is managed by the BLM as part of the seven mile allotment. Cattle use occurs for approximately 20 days in May under a deferred grazing system. A pellet group transect nearby on Dog Flat indicated 30 deer days use/acre (73 ddu/ha) during the winter of 1984-85. Elk use varies (Jense et al. 1985). Animal use is currently light as indicated by pellet group transect data from the site in 1999. Deer use is currently estimated at 17 days use/acre (43 ddu/ha), elk at 1 day use/acre (3 edu/ha), and cattle use at 8 days use/acre (20 cdu/ha). Antelope could also use the area. Good thermal and escape cover is provided by thick stands of unchained pinyon about 1/10 mile away.

The soil is a very compact clay loam with a loose surface layer. Soil depth is moderately shallow with an estimated effective rooting depth of almost 11 inches. The soil has a neutral pH (7.3) and is low in phosphorus at 6.7 ppm, where 10 ppm has been shown necessary for normal plant growth and development. A dense hardpan is located at a little more than a foot in depth, which could be limiting for roots of shrubs. Pavement and rock combined provide nearly half of the ground cover. Bare ground is low currently at 13%. There is some movement of pavement and soil with pedestaling and puddling apparent, but erosion is not considered serious.

The key browse species is mountain big sagebrush. All of the sagebrush have been classified as mountain big sagebrush, although some of the plants resemble black sagebrush in growth form and foliage color. This population had a stable density estimated at 5,332 plants/acre in 1985, 6,266 plants/acre in 1991, and 6,180 plants/acre in 1999. Biotic potential and recruitment were very high in 1985 and 1991, but dropped to lower levels in 1999. The decadency rate for this population is relatively low at 15%. Currently, vigor is mostly good with light to moderate use on the majority of the population. Seventeen percent of the population displayed heavy use in 1999. Broom snakeweed is the most abundant species on the Lower Dog Flat site, currently estimated at 20,580 plants/acre. The density was much lower in 1991 at 4,333 plants/acre due to drought conditions, but with better precipitation in the past few years, this species is again on the rise. Biotic potential and young recruitment are high at respectively 12% and 68%, which indicates an increasing population in the future. Other browse species include prickly phlox and pricklypear cactus, which are increasers with moderate to heavy cattle grazing.

Grass composition was initially dominated by smooth brome (highest sum of nested frequency), a valuable seeded species in 1985, but because of a new road that went through the baseline, it was relocated in 1991. This relocation especially affected sum of nested frequency values for crested wheatgrass and smooth brome because of the small size of the sampled area. Since then, the sampling design was increased to 500 feet, allowing a much better sampling design for herbaceous species. Currently, blue grama and bottlebrush squirreltail are the dominant species. Blue grama provided 82% of the grass cover in 1999, with bottlebrush squirreltail providing an additional 15%. Both are increasers that have only fair forage value. Forbs are insignificant and infrequently encountered. Seeded forbs, alfalfa, yellow sweet clover, and small burnet, were infrequent the first year the site was read, and were not sampled in 1999.

1985 APPARENT TREND ASSESSMENT

The soil appears stable with the added litter and the seeded grasses. Reestablishment of the key browse species, mountain big sagebrush, is encouraging but the density of broom snakeweed raises some concerns. This chaining must be protected from heavy grazing for a number of years to insure that this undesirable invader further increases its density.

1991 TREND ASSESSMENT

The soil appears to still be stable. Percent rock, pavement, and litter have switched around somewhat, but percent bare ground is still about the same. Typically, broom snakeweed dies off in large numbers during a drought, especially an extended drought. This was no exception on this site with 97% of the population dying off since 1985. The population went from 18,466 to only 4,333 plants/acre. The key species, mountain big sagebrush, increased during this same period by 15%, but much of this could have been because of the relocation of the baseline. The percent of young plants has also improved. It has gone from 27% in 1985 to 40% in 1991. The trend for browse is considered stable. The herbaceous understory is difficult to determine because of the relocation of the baseline which would especially effect nested frequency values for the herbaceous species, but with the examination of the data for the other eight sites, it would still be considered stable.

TREND ASSESSMENT

soil - stable

browse - stable

herbaceous understory - stable

1999 TREND ASSESSMENT

Trend for soil is stable. Erosion is not serious with the gentle slope and adequate vegetation and litter cover. Trend for browse is stable overall. The key species, mountain big sagebrush, shows a stable trend with the population density, percent decadency and vigor all remaining stable. Use has increased somewhat, but is still mostly light to moderate. Recruitment is moderate at 12%. There was an explosion of broom snakeweed population in 1999. It should be recalled how the population crashed in 1991 with drought. This species was greatly reduced due to the extended drought in the late 1980's and early 1990's and competition with the sagebrush. However, with improved precipitation in recent years, this species is again increasing. Trend for the herbaceous understory is stable. Perennial grasses are the most abundant group and have increased slightly in sum of nested frequency in 1999.

TREND ASSESSMENT

soil - stable

browse - stable for the key species mountain big sagebrush, with a significant increase in broom snakeweed which should be monitored closely

herbaceous understory - stable

HERBACEOUS TRENDS --
Herd unit 25A, Study no: 8

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover % '99
		'85	'91	'99	'85	'91	'99	
G	Agropyron cristatum	c43	a-	b14	19	-	5	.07
G	Agropyron intermedium	b6	a-	ab2	4	-	1	.00
G	Agropyron spp.	-	7	-	-	3	-	-
G	Agropyron spicatum	26	-	-	13	-	-	-
G	Bouteloua gracilis	a115	a166	b215	47	61	75	7.15
G	Bromus inermis	c141	a-	b11	56	-	6	.13
G	Koeleria cristata	-	-	4	-	-	2	.03
G	Poa fendleriana	2	-	3	2	-	1	.00
G	Sitanion hystrix	a41	b149	b137	21	65	57	1.27
G	Stipa comata	-	-	3	-	-	1	.03
G	Stipa pinetorum	b17	ab13	a3	9	6	1	.00
Total for Annual Grasses		0	0	0	0	0	0	0
Total for Perennial Grasses		391	335	392	171	135	149	8.71
Total for Grasses		391	335	392	171	135	149	8.71
F	Androsace septentrionalis (a)	-	-	27	-	-	14	.14
F	Arabis demissa	b27	b20	a3	14	11	1	.00
F	Astragalus spp.	3	-	-	2	-	-	-
F	Chaenactis douglasii	3	-	-	1	-	-	-
F	Cryptantha spp.	b16	b10	a-	6	6	-	-
F	Descurainia pinnata (a)	-	10	5	-	4	2	.01
F	Eriogonum ovalifolium	6	3	3	4	2	1	.03
F	Erigeron pumilus	a16	ab22	b40	8	13	18	.21
F	Machaeranthera canescens	2	-	-	1	-	-	-
F	Melilotus officinalis	b8	a-	a-	3	-	-	-
F	Medicago sativa	b16	a-	a-	7	-	-	-
F	Penstemon comarrhenus	1	-	-	1	-	-	-
F	Phlox longifolia	a4	b22	a4	2	10	2	.01
F	Sanguisorba minor	3	-	-	1	-	-	-
F	Salsola pestifer (a)	2	-	-	1	-	-	-
F	Unknown forb-perennial	b11	a-	a-	7	-	-	-
Total for Annual Forbs		2	10	32	1	4	16	0.15
Total for Perennial Forbs		116	77	50	57	42	22	0.25
Total for Forbs		118	87	82	58	46	38	0.41

Values with different subscript letters are significantly different at $\alpha = 0.10$ (annuals excluded)

BROWSE TRENDS --

Herd unit 25A, Study no: 8

Type	Species	Strip Frequency '99	Average Cover % '99
B	Artemisia nova	1	-
B	Artemisia tridentata vaseyana	93	17.72
B	Gutierrezia sarothrae	84	1.20
B	Leptodactylon pungens	0	-
B	Opuntia spp.	2	-
B	Pinus edulis	0	-
Total for Browse		180	18.93

BASIC COVER --

Herd unit 25A, Study no: 8

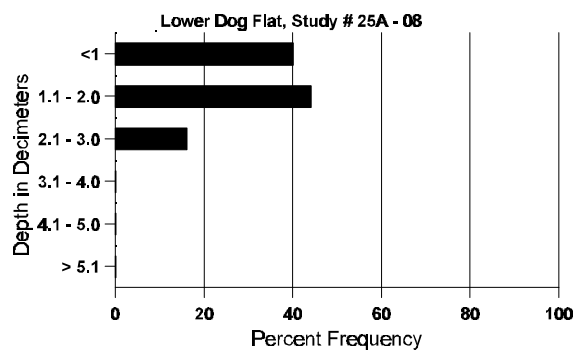
Cover Type	Nested Frequency '99	Average Cover %		
		'85	'91	'99
Vegetation	303	8.00	7.50	27.16
Rock	323	8.00	29.75	24.86
Pavement	343	33.00	17.25	24.32
Litter	348	37.00	29.75	20.95
Cryptogams	14	0	0	.08
Bare Ground	291	14.00	15.75	13.14

SOIL ANALYSIS DATA --

Herd Unit 25A, Study # 08, Study Name: Lower Dog Flat

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
10.7	52.6 (11.6)	7.3	43.3	29.4	27.3	2.3	6.7	201.6	0.7

Stoniness Index



PELLET GROUP FREQUENCY --

Herd unit 25A, Study no: 8

Type	Quadrat Frequency Ø9	Pellet Transect Days Use/Acre (ha) Ø9
Rabbit	26	n/a
Elk	3	1(2)
Deer	10	17(42)
Cattle	4	8(20)

BROWSE CHARACTERISTICS --

Herd unit 25A, Study no: 8

A G R E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Artemisia nova																		
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	99	-	1	-	-	-	-	-	-	-	-	1	-	-	-	20	5	9
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		00%			00%			00%										
'91		00%			00%			00%										
'99		100%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	0	Dec:	-			
												'91	0		-			
												'99	20		-			
Artemisia tridentata vaseyana																		
S	85	80	-	-	-	-	-	-	-	-	80	-	-	-	5333			80
	91	5	-	-	-	-	-	8	-	-	13	-	-	-	866			13
	99	5	-	-	-	-	-	-	-	-	5	-	-	-	100			5
Y	85	22	-	-	-	-	-	-	-	-	22	-	-	-	1466			22
	91	38	-	-	-	-	-	-	-	-	38	-	-	-	2533			38
	99	19	7	11	1	-	-	-	-	-	38	-	-	-	760			38
M	85	45	1	-	-	-	-	-	-	-	46	-	-	-	3066	18	17	46
	91	36	8	-	-	-	-	-	-	-	42	2	-	-	2933	19	18	44
	99	93	92	37	-	2	-	-	-	-	224	-	-	-	4480	16	26	224
D	85	12	-	-	-	-	-	-	-	-	12	-	-	-	800			12
	91	12	-	-	-	-	-	-	-	-	7	-	-	5	800			12
	99	23	12	3	4	1	1	3	-	-	30	-	-	17	940			47
X	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	300			15
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		01%			00%			00%			+15%							
'91		09%			00%			05%			- 1%							
'99		37%			17%			06%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	5332	Dec:	15%			
												'91	6266		13%			
												'99	6180		15%			

A G R E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Gutierrezia sarothrae																		
S	85	194	-	-	-	-	-	-	-	-	194	-	-	-	12933		194	
	91	178	-	-	-	-	-	11	-	-	189	-	-	-	12600		189	
	99	140	-	-	-	-	-	-	-	-	140	-	-	-	2800		140	
Y	85	95	-	-	-	-	-	-	-	-	95	-	-	-	6333		95	
	91	18	-	-	-	-	-	-	-	-	18	-	-	-	1200		18	
	99	701	-	-	-	-	-	3	-	-	704	-	-	-	14080		704	
M	85	182	-	-	-	-	-	-	-	-	182	-	-	-	12133	9	9	182
	91	31	4	-	1	-	-	2	-	-	38	-	-	-	2533	2	3	38
	99	321	-	-	-	-	-	-	-	-	321	-	-	-	6420	6	6	321
D	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	8	1	-	-	-	-	-	-	-	6	-	-	3	600		9	
	99	3	-	-	1	-	-	-	-	-	3	-	-	1	80		4	
X	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	100		5	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		00%			00%			00%			-77%							
'91		08%			00%			05%			+79%							
'99		00%			00%			.09%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	18466	Dec:	0%			
												'91	4333		14%			
												'99	20580		0%			
Leptodactylon pungens																		
S	85	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	85	2	-	-	-	-	-	-	-	-	2	-	-	-	133	7	7	2
	91	1	-	-	-	-	-	-	-	-	1	-	-	-	66	3	4	1
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
D	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	-	1	-	-	-	-	-	-	-	1	-	-	-	66		1	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		00%			00%			00%			+33%							
'91		33%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	133	Dec:	0%			
												'91	198		33%			
												'99	0		0%			

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.	Total
		1	2	3	4	5	6	7	8	9	1	2	3	4			
Opuntia spp.																	
Y	85	2	-	-	-	-	-	-	-	-	2	-	-	-	133		2
	91	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0
	99	-	-	-	2	-	-	-	-	-	2	-	-	-	40	3	2
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'85		00%			00%			00%			-50%						
'91		00%			00%			00%			-39%						
'99		00%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)												'85	133	Dec:	-		
												'91	66		-		
												'99	40		-		
Pinus edulis																	
S	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	99	1	-	-	1	-	-	-	-	-	2	-	-	-	40		2
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'85		00%			00%			00%									
'91		00%			00%			00%									
'99		00%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)												'85	0	Dec:	-		
												'91	0		-		
												'99	0		-		

Trend Study 25A-9-99

Study site name: Row of Pines .

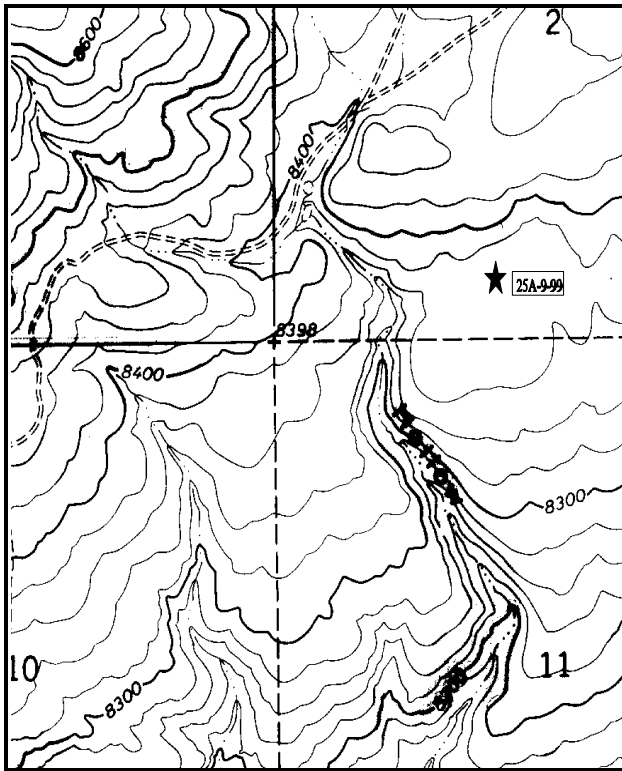
Range type: Big Sagebrush .

Compass bearing: frequency baseline 165°M.

Footmark (first frame at) 5 feet, footmarks (frequency belts) line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

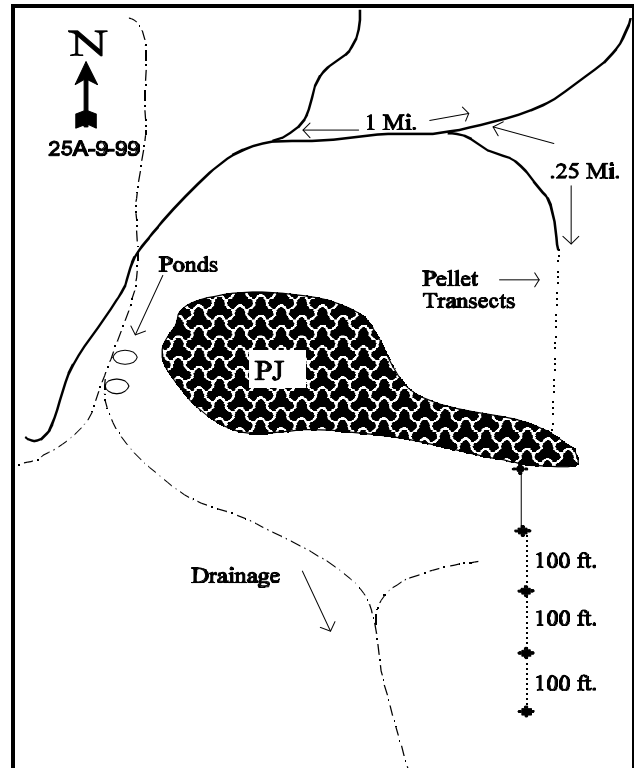
LOCATION DESCRIPTION

From Loa, proceed northwest on U-24 for 3.8 miles (0.9 miles beyond mile marker 49). Turn right and go 0.7 miles to a cattleguard. Just beyond the cattleguard turn right and go another 0.7 miles. Turn right and go across a cattleguard. Proceed 2.7 miles to an intersection, turn right and continue 1.3 miles to a stock pond on the east side of the road. Continue 0.2 miles to a fork, turn right and go 0.05 miles. Turn right and go 0.25 miles to the end of the road, where a pellet group transect begins. On the left side of the road is a gray fence post which marks the north end of the pellet transect. Count 16 stakes south through the belt of pinyon-juniper (the 16th stake is 25 feet from the trees). The beginning of the frequency baseline is 50 feet west of the 16th pellet group stake. Rebar (2-1/2 feet tall) is used to mark the transect, the 0-foot baseline stake has a red browse tag #7064 attached.



Map Name: Loa, Utah

Township 27S , Range 2E , Section 2



Diagrammatic Sketch

UTM 4259722.469 N, 442185.117 E

DISCUSSION

Trend Study No. 25A-9 (44-3)

The Row of Pines trend study is located near the top of a gently sloping bench, north of Loa, near a row of pinyon pines. The bench has a general south aspect, but the site is nearly level. Elevation is 8,400 feet. The study samples a sagebrush-perennial grass type starting near a stand of pinyon and juniper trees. Besides the trees near the 0 foot stake, there are few trees and escape cover on the sagebrush flat. This area is within the seven mile allotment which allows cattle grazing on a deferred rotation system for approximately 20 days in May. Pellet group data from the site in 1999 estimate light use with 13 deer, 1 elk, and 3 cow days use/acre (32 ddu/ha, 3 edu/ha, 7 cdu/ha). Rabbit sign was also moderately abundant. Deer and rabbit pellets were more common near the 0 foot stake which is closer to the escape and thermal cover of the pinyon and juniper trees.

Soil at the site is moderately shallow with abundant gravel sized rocks on the surface and throughout the soil profile. Texture is a sandy clay loam with a neutral pH (6.9). Organic matter is low at only 1.1% and phosphorus is marginal at 9.1 ppm. Values less than 10 ppm have been shown to limit normal plant growth and development. The majority of protective ground cover comes shrubs and pavement. Litter is low and has steadily declined since 1988, while rock and pavement cover have steadily increased. However, percent cover of bare ground was relatively low at 18% in 1988 and 1999. The protective ground cover and gentle slope appear to preclude serious erosion problems.

The dominant browse is Wyoming big sagebrush which provided 72% of the browse cover in 1999, with a cover value of 25%. These shrubs displayed moderate to heavy hedging in 1988 with lighter use reported in 1991 and 1999. Many of the sagebrush have displayed short leader growth and few seed stalks over the years, indicating poor vigor. Decadent plants are common with percent decadence ranging between 41% and 52% since 1988. In addition, many decadent plants have been classified as dying since 1988, although the population overall has remained relatively stable. Seedlings were common in 1988 yet lacking in 1991 and 1999. Young plants have been moderately abundant on each reading, but not in high enough numbers to replace decadent/dying individuals. Currently 44% of the 2,900 decadent plants are classified as dying (1,276 plants/acre) and there are only 380 young plants/acre available to replace them indicating an apparent decline in the population.

The black sagebrush had a similar age structure to mountain big sagebrush in 1988 and 1991. Utilization was moderate in 1988 and 1999 but mostly light in 1991. Vigor was considered poor on one-third of the population in 1991, although only 8% of the black sagebrush currently display poor vigor. Recruitment is currently poor with no seedlings and few young sampled in 1999. Broom snakeweed is the most numerous browse species, especially on the upper (south) end of the study site. It had a high density of 10,732 plants/acre in 1988, which dropped dramatically to only 1,465 plants/acre in 1991. This was a common occurrence throughout the management area. The much larger sample used in 1999 estimated a similar density compared to 1988 at 11,300 plants/acre. It currently ('99) has a mostly mature population. Other increasers present in low numbers are narrowleaf low rabbitbrush and prickly pear cactus.

The herbaceous understory is dominated by blue grama, a low-growing warm season perennial that provides very little forage. It currently provides 84% of the grass cover and 73% of the herbaceous cover. The only other grass found more than occasionally is bottlebrush squirreltail. Forbs are small and sparse. They provided only about 1% total cover in 1999.

1985 APPARENT TREND ASSESSMENT

Soil trend appears stable and there is no serious erosion evident. The vegetative trend is presently down, as populations of big and black sagebrush appear to be declining.

1991 TREND ASSESSMENT

Soil trend is slightly downward because of lower vegetative cover and increase in bare ground and decrease in litter cover. These are all downward indicators reflective of an extended drought. The two key browse species are also showing a slightly downward trend with population losses of 5% and 2% respectively for black sagebrush and Wyoming big sagebrush. The occurrence of Wyoming big sagebrush on this site instead of mountain big sagebrush, further illustrates the relative dryness of the site. This is additionally compounded by the relatively high density the sagebrush populations contends with on this site. The herbaceous understory trend is stable but in poor condition because the dominant grass is a very low growing warm season grass (blue grama) which is of little value for spring or fall use.

TREND ASSESSMENT

soil - slightly downward, could quickly change with the return of normal precipitation patterns

browse - slightly downward

herbaceous understory - stable but poor

1999 TREND ASSESSMENT

Trend for soil is up. Percent cover of bare ground has declined from 28% to 18%. Litter cover has declined however, and percent cover of rock and pavement has increased slightly. Vegetation cover numbers increased dramatically, but vegetation cover data from 1988 and 1991 measured only basal cover, while aerial cover is estimated now so the numbers are not comparable. There appears to be little erosion due to the levelness of the terrain. Trend for the key species, Wyoming big sagebrush is down slightly. Density has declined since 1991, but some of the change is due to the much larger sample used in 1999. Use is heavier, and percent decadence remains high. In addition, a large portion of the decadent plants sampled (44%) appear to be dying. Recruitment is currently inadequate to replace the dying plants. The less abundant black sagebrush appears to be more stable but only contributes to 13% of the browse cover. Trend for the herbaceous understory is up for grasses and stable for forbs. Overall trend is considered up since grasses provide nearly all of the herbaceous cover. Composition is poor however, with the low growing warm season, blue grama, providing 84% of the grass cover.

TREND ASSESSMENT

soil - up

browse - slightly downward

herbaceous understory - up but composition is poor

HERBACEOUS TRENDS --
Herd unit 25A, Study no: 9

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover %
		'85	'91	'99	'85	'91	'99	
G	Agropyron smithii	a-	a-	b ¹²	-	-	4	.07
G	Agropyron spicatum	-	-	6	-	-	2	.01
G	Bouteloua gracilis	100	102	173	43	43	63	5.55
G	Oryzopsis hymenoides	b ³¹	a ⁷	a ¹⁰	16	3	6	.10
G	Poa secunda	-	-	2	-	-	1	.00
G	Sitanion hystrix	a ⁵⁸	ab ⁸²	b ¹¹⁰	30	41	47	.84
G	Stipa pinetorum	a-	b ⁴	ab ⁴	-	3	2	.03
Total for Annual Grasses		0	0	0	0	0	0	0
Total for Perennial Grasses		189	195	317	89	90	125	6.63
Total for Grasses		189	195	317	89	90	125	6.63
F	Androsace septentrionalis (a)	-	-	87	-	-	40	.44
F	Arabis demissa	b ²²	ab ¹²	a ⁶	13	7	3	.04
F	Astragalus lentiginosus	b ²¹	a ³	a ³	12	2	2	.01
F	Cryptantha spp.	ab ²	b ⁷	a-	1	3	-	-
F	Descurainia pinnata (a)	-	-	4	-	-	2	.01
F	Eriogonum ovalifolium	7	16	13	5	8	8	.19
F	Erigeron pumilus	b ²⁰	a-	b ³⁴	9	-	17	.23
F	Phlox longifolia	a ⁸	b ³³	a-	5	15	-	.00
F	Senecio multilobatus	a-	a ¹	b ²³	-	1	13	.06
Total for Annual Forbs		0	0	91	0	0	42	0.45
Total for Perennial Forbs		80	72	79	45	36	43	0.54
Total for Forbs		80	72	170	45	36	85	0.99

Values with different subscript letters are significantly different at $\alpha = 0.10$ (annuals excluded)

BROWSE TRENDS --

Herd unit 25A, Study no: 9

T y p e	Species	Strip Frequency 09	Average Cover % 09
B	Artemisia frigida	6	.03
B	Artemisia nova	20	4.51
B	Artemisia tridentata wyomingensis	93	24.40
B	Chrysothamnus viscidiflorus	0	-
B	Gutierrezia sarothrae	64	4.71
B	Opuntia fragilis	11	.06
B	Pediocactus simpsonii	1	-
B	Pinus edulis	0	-
Total for Browse		195	33.74

BASIC COVER --

Herd unit 25A, Study no: 9

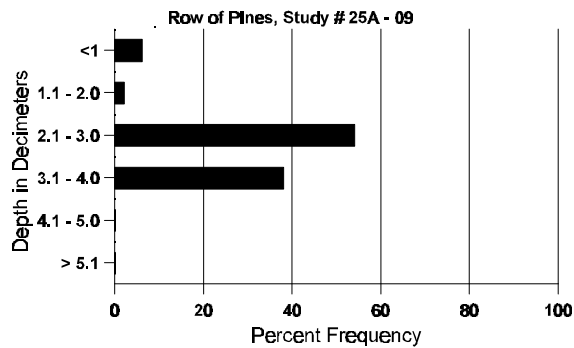
Cover Type	Nested Frequency 09	Average Cover %		
		'85	'91	'99
Vegetation	346	10.00	6.00	41.90
Rock	285	2.75	3.75	8.67
Pavement	405	31.75	34.75	33.29
Litter	413	34.50	24.50	22.44
Cryptogams	103	3.50	3.50	2.30
Bare Ground	362	17.50	27.50	18.19

SOIL ANALYSIS DATA --

Herd Unit 25A, Study # 09, Study Name: Row of Pines

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
12.7	51.6 (13.6)	6.9	51.3	23.4	25.3	1.1	9.1	192.0	0.5

Stoniness Index



PELLET GROUP FREQUENCY --

Herd unit 25A, Study no: 9

Type	Quadrat Frequency Ø9	Pellet Transect Days Use/Acre (ha) Ø9
Rabbit	28	n/a
Deer	15	13(32)
Elk	0	1(2)
Cattle	3	3(7)

BROWSE CHARACTERISTICS --

Herd unit 25A, Study no: 9

A Y G R E	Form Class (No. of Plants)	Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.	Total									
		1	2	3	4				5	6	7	8	9	1	2	3	4
Artemisia frigida																	
Y	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	99	1	-	-	-	-	-	-	-	-	-	1	-	-	20		1
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0
	99	2	2	5	1	-	-	-	-	-	-	10	-	-	200	3	4
D	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	99	1	-	-	-	-	-	-	-	-	-	1	-	-	20		1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'85		00%			00%			00%									
'91		00%			00%			00%									
'99		17%			42%			00%									
Total Plants/Acre (excluding Dead & Seedlings)												'85	0	Dec:	0%		
												'91	0		0%		
												'99	240		8%		

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Artemisia nova																		
S	85	4	-	-	-	-	-	-	-	-	4	-	-	-	266		4	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	85	7	-	-	-	-	-	-	-	-	7	-	-	-	466		7	
	91	4	-	-	-	-	-	-	-	-	4	-	-	-	266		4	
	99	2	2	-	-	-	-	-	-	-	4	-	-	-	80		4	
M	85	3	13	-	-	-	-	-	-	-	16	-	-	-	1066	10	13	
	91	13	-	-	-	1	-	-	-	-	14	-	-	-	933	8	14	
	99	12	43	4	2	-	-	-	-	-	61	-	-	-	1220	10	17	
D	85	9	8	-	-	-	-	-	-	-	17	-	-	-	1133		17	
	91	18	1	-	1	-	-	-	-	-	7	1	-	12	1333		20	
	99	5	10	-	-	-	-	-	-	-	9	-	-	6	300		15	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		53%			00%			00%			- 5%							
'91		05%			00%			32%			-37%							
'99		69%			05%			08%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	2665	Dec:	43%			
												'91	2532		53%			
												'99	1600		19%			
Artemisia tridentata wyomingensis																		
S	85	7	-	-	-	-	-	-	-	-	7	-	-	-	466		7	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	1	-	-	3	-	-	2	-	-	6	-	-	-	120		6	
Y	85	3	2	2	-	-	-	-	-	-	7	-	-	-	466		7	
	91	12	-	-	-	-	-	-	1	-	13	-	-	-	866		13	
	99	17	-	-	-	-	-	2	-	-	19	-	-	-	380		19	
M	85	6	44	10	-	-	-	-	-	-	60	-	-	-	4000	16	17	
	91	20	8	-	19	-	-	-	-	-	47	-	-	-	3133	16	19	
	99	48	109	30	4	-	-	-	-	-	191	-	-	-	3820	18	28	
D	85	6	30	23	-	-	-	-	-	-	43	-	-	16	3933		59	
	91	38	14	6	5	1	-	-	-	-	51	-	1	12	4266		64	
	99	77	34	14	7	9	-	4	-	-	81	-	-	64	2900		145	
X	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	800		40	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		60%			28%			13%			- 2%							
'91		19%			05%			10%			-14%							
'99		43%			12%			18%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	8399	Dec:	47%			
												'91	8265		52%			
												'99	7100		41%			

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Chrysothamnus viscidiflorus																		
M	85	3	-	-	-	-	-	-	-	-	3	-	-	-	200	7	9	3
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
D	85	4	-	-	-	-	-	-	-	-	4	-	-	-	266			4
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		00%			00%			00%										
'91		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	466	Dec:	57%			
												'91	0		0%			
												'99	0		0%			
Gutierrezia sarothrae																		
S	85	20	-	-	-	-	-	-	-	-	20	-	-	-	1333			20
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	43	-	-	-	-	-	-	-	-	43	-	-	-	860			43
Y	85	52	-	-	-	-	-	-	-	-	52	-	-	-	3466			52
	91	9	1	-	-	-	-	-	-	-	10	-	-	-	666			10
	99	44	-	-	-	-	-	-	-	-	44	-	-	-	880			44
M	85	102	2	-	-	-	-	-	-	-	104	-	-	-	6933	8	7	104
	91	1	-	-	1	2	-	-	-	-	4	-	-	-	266	2	2	4
	99	504	-	-	6	-	-	-	-	-	510	-	-	-	10200	8	9	510
D	85	5	-	-	-	-	-	-	-	-	5	-	-	-	333			5
	91	3	2	2	-	-	-	1	-	-	6	1	-	1	533			8
	99	11	-	-	-	-	-	-	-	-	6	-	-	5	220			11
X	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	220			11
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		01%			00%			00%										
'91		23%			09%			05%										
'99		00%			00%			.88%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	10732	Dec:	3%			
												'91	1465		36%			
												'99	11300		2%			

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Opuntia fragilis																		
S	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	1	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
Y	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	-	-	-	-	-	-	1	-	-	-	-	-	-	66		1	
	99	1	-	-	-	-	-	1	-	-	2	-	-	-	40		2	
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	99	10	-	-	1	-	-	-	-	-	11	-	-	-	220	3	9	
X	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	40		2	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		00%			00%			00%										
'91		00%			00%			00%			+75%							
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	0	Dec:	-			
												'91	66		-			
												'99	260		-			
Pediocactus simpsonii																		
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20	1	2	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		00%			00%			00%										
'91		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	0	Dec:	-			
												'91	0		-			
												'99	20		-			
Pinus edulis																		
S	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	1	-	-	1	-	-	-	-	-	2	-	-	-	40		2	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		00%			00%			00%										
'91		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	0	Dec:	-			
												'91	0		-			
												'99	0		-			

Trend Study 25A-10-99

Study site name: Cedarless Flat .

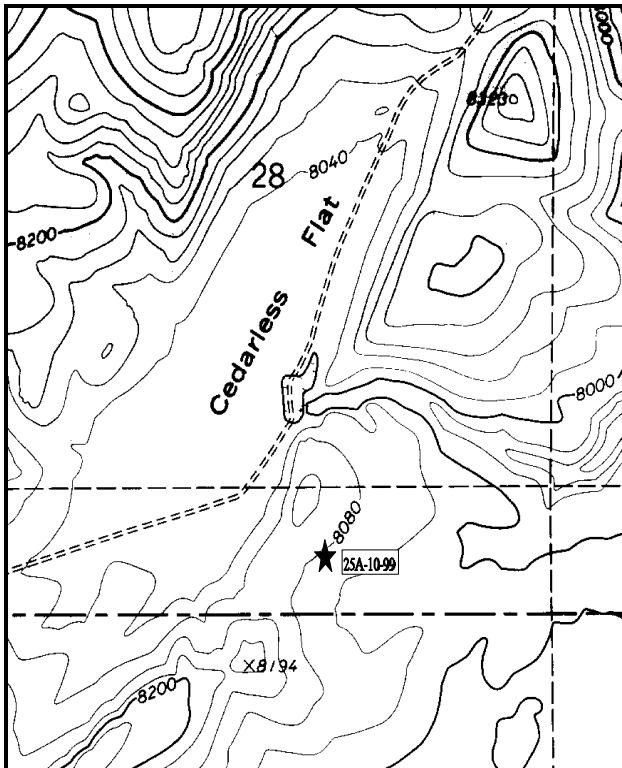
Range type: Big Sagebrush .

Compass bearing: frequency baseline 165°M.

Footmark (first frame at) 5 feet, footmarks (frequency belts) line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

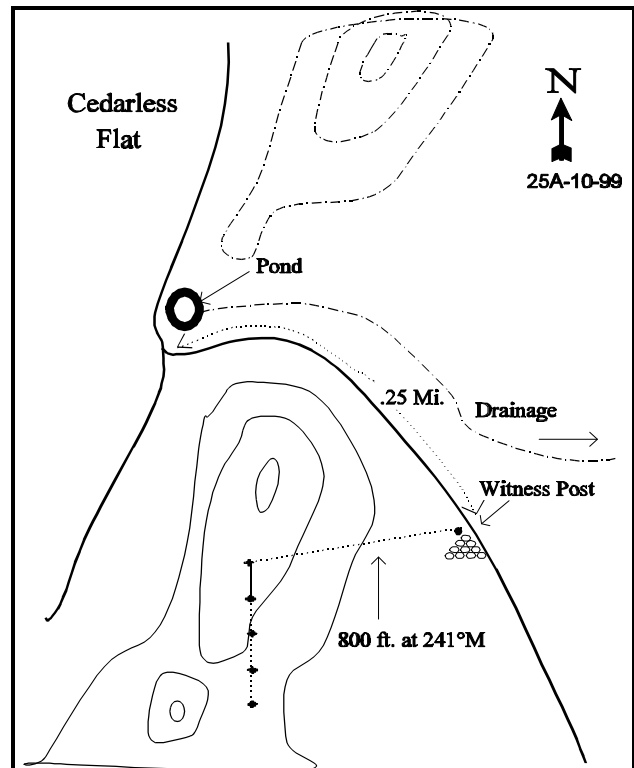
LOCATION DESCRIPTION

From Fremont, travel northeast on SR72 for 2.25 miles to a major fork (the sign says Mill Meadow Reservoir). Turn left and proceed 4.5 miles past the reservoir to Fremont Creek. Cross the bridge and go 0.4 miles to a fork. Bear left on the Mytoge Road and go 1.1 miles to a cattleguard in Cedarless Flat. From the cattleguard, go 0.6 miles to a fork. Turn left and go exactly 0.25 miles to a witness post on the south side of the road. From the witness post, go 800 feet at 241°M to the 0 ft baseline stake. The baseline stake is marked with a red browse tag number 407.



Map Name: Forsyth Reservoir, Utah

Township 26S , Range 3E , Section 33



Diagrammatic Sketch

UTM 4262560.895 N, 448854.172 E

DISCUSSION

Trend Study No. 25A-10 (44-4)

The Cedarless Flat transect is located on a sagebrush hill that is part of critical deer winter and spring range. The land is managed by the Forest Service and has had a long history of overgrazing. Better early spring range is needed to help alleviate depredation by big game on the agricultural lands around Fremont. The area was chained and seeded in 1987 to reduce sagebrush and increase availability of the needed succulent forbs and cool season grasses. Several areas were excluded from the treatment to retain sage grouse habitat. By 1999, treatment boundaries were nearly indistinguishable. The area is within the UM allotment which is grazed in the spring for generally two weeks from June 1st to June 15th as conditions permit. Pellet group data from the site estimate 7 deer, 21 elk, and 4 cow days use/acre (17 ddu/ha, 52 edu/ha, 10 cdu/ha). Escape and thermal cover is limited to thick stands of juniper approximately one-fourth mile away.

The soil is moderately shallow, compacted, and relatively stable. Effective rooting depth is estimated at just over 14 inches. It has a clay loam texture with a slightly alkaline pH (7.4). Phosphorus is limited at 7 ppm. Values less than 10 ppm have been shown to limit normal plant growth and development. Erosion pavement and rocks are common on the soil surface ranging from 57% cover in 1988 to 37% in 1999. Litter cover is low and there is a moderate amount of localized soil movement occurring.

Wyoming big sagebrush currently ('99) makes up 94% of the browse cover and dominates the vegetative community. The majority are mature plants, averaging about one foot in height and a crown of one and one-half to two feet. All the available sagebrush have shown light to moderate hedging and some individuals display heavy use. Density was high at 8,798 plants/acre in 1985, prior to the treatment. By 1991, there were 6,599 plants/acre estimated and 4,440 plants/acre by 1999. Some of the change in density between 1991 and 1999 may be partly due to the larger sample used in 1999. Currently the sagebrush population appears dynamic with low percent decadence, good vigor, and high numbers of young plants. There are also a few black sagebrush plants on the site.

Other browse present on the site include broom snakeweed, stickyleaf low rabbitbrush, and scattered juniper and pinyon trees. The small population of broom snakeweed reported in 1985 has increased dramatically in density to 4,240 plants/acre. About one-half of the population consists of young plants, which would indicate an expanding population.

Herbaceous vegetation was particularly sparse and insignificant prior to the treatment. Sum of nested frequency more than doubled after. Currently blue grama and seeded Russian wildrye are the most common grasses. Seeded crested wheatgrass and Indian ricegrass are also fairly common. Forbs are still lacking and provide very little cover or forage. All forb species combined produced only 1/10th of 1% cover in 1999.

1985 APPARENT TREND ASSESSMENT

Soil condition appears stable while vegetative trend down. The age structure and general vigor of the sagebrush indicates a declining population. Cool season grasses and forbs and valuable forage plants are conspicuously absent.

1991 TREND ASSESSMENT

Soil condition is still considered stable even with the increase in percent bare ground (still relatively low for a sagebrush-grass site), for the area was chained and seeded in 1987. There are currently many more grasses established on the site. The browse trend is up because the treatment thinned the sagebrush and it shows good vigor and a much lower percent of the population is decadent. The herbaceous understory is greatly improved with many cool season grasses established since treatment.

TREND ASSESSMENT

soil - stable

browse - up

herbaceous understory - up

1999 TREND ASSESSMENT

Trend for soil is still considered stable. Percent cover of bare ground is similar to 1991 estimates, while litter cover has declined. This is primarily due to the deterioration of chaining debris. Herbaceous cover is still moderately abundant and erosion is not a serious problem. Trend for browse is stable. Density of the key species, Wyoming big sagebrush, has declined 18% but some of the difference is due to the much larger sample used in 1999. Utilization is moderate to heavy but vigor is good and percent decadence has declined from 14% to 4%. Young plants are abundant and account for 31% of the population. This combined with the low number of decadent plants would indicate an expanding population. One negative aspect of the browse trend is the dramatic increase in broom snakeweed to 4,240 plants/acre. Only 599 plants/acre were estimated prior to the treatment in 1985 and no broom snakeweed was encountered in 1991. Trend for the herbaceous understory is down slightly. Sum of nested frequency of perennial grasses has declined slightly, yet more importantly, sum of nested frequency for the seeded crested wheatgrass has declined significantly with frequency of the less desirable, low growing, warm season blue grama, has increased significantly. Most of the seeded grasses were found growing only within the protection of sagebrush canopies, which would indicate spring grazing pressure. Forbs are still rare in their occurrence and therefore not an important component on this site.

TREND ASSESSMENT

soil - stable

browse - stable

herbaceous understory - down slightly

HERBACEOUS TRENDS --

Herd unit 25A, Study no: 10

T y p e	Species	Nested Frequency			Quadrat Frequency			Average Cover % '99
		'85	'91	'99	'85	'91	'99	
G	Agropyron cristatum	a-	c155	b41	-	69	16	1.14
G	Bouteloua gracilis	a70	b104	c193	30	47	70	8.30
G	Bromus inermis	a-	c55	b12	-	29	5	.22
G	Bromus tectorum (a)	-	3	-	-	1	-	-
G	Carex spp.	a-	a-	b15	-	-	5	.07
G	Elymus junceus	a-	b84	b61	-	42	27	2.59
G	Oryzopsis hymenoides	ab15	a15	b36	9	7	17	.72
G	Sitanion hystrix	b97	b75	a29	41	36	16	.20
G	Stipa lettermani	1	5	4	1	2	2	.01
Total for Annual Grasses		0	3	0	0	1	0	0
Total for Perennial Grasses		183	493	391	81	232	158	13.29
Total for Grasses		183	496	391	81	233	158	13.29
F	Androsace septentrionalis (a)	-	-	11	-	-	5	.02

T y p e	Species	Nested Frequency			Quadrat Frequency			Average Cover % 09
		'85	'91	'99	'85	'91	'99	
F	Arabis demissa	9	2	3	5	2	1	.00
F	Astragalus lentiginosus	_b 4	_a -	_{ab} 5	3	-	2	.03
F	Cryptantha spp.	5	3	1	3	1	1	.03
F	Eriogonum ovalifolium	_b 5	_{ab} 1	_a -	3	1	-	-
F	Erigeron pumilus	4	1	-	2	1	-	-
F	Phlox longifolia	1	5	1	1	4	1	.00
F	Senecio multilobatus	5	-	-	2	-	-	-
Total for Annual Forbs		0	0	11	0	0	5	0.02
Total for Perennial Forbs		33	12	10	19	9	5	0.07
Total for Forbs		33	12	21	19	9	10	0.10

Values with different subscript letters are significantly different at % = 0.10 (annuals excluded)

BROWSE TRENDS --

Herd unit 25A, Study no: 10

T y p e	Species	Strip Frequency 09	Average Cover % 09
B	Artemisia nova	2	-
B	Artemisia tridentata wyomingensis	83	9.25
B	Chrysothamnus viscidiflorus viscidiflorus	9	.15
B	Gutierrezia sarothrae	56	.38
B	Opuntia spp.	2	.03
B	Pediocactus simpsonii	3	.03
Total for Browse		155	9.84

BASIC COVER --

Herd unit 25A, Study no: 10

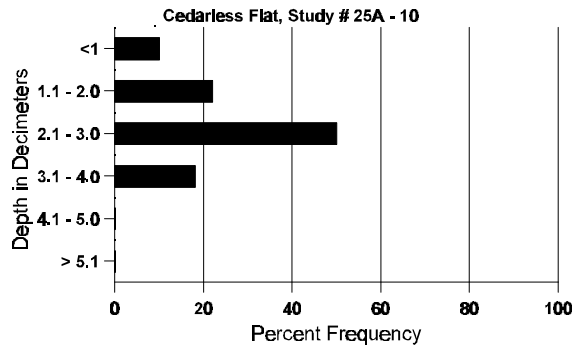
Cover Type	Nested Frequency 09	Average Cover %		
		'85	'91	'99
Vegetation	285	1.50	4.50	23.21
Rock	300	6.00	8.00	9.06
Pavement	371	51.00	46.50	27.46
Litter	347	32.50	22.75	13.73
Cryptogams	1	0	0	.00
Bare Ground	339	9.00	18.25	20.26

SOIL ANALYSIS DATA --

Herd Unit 25A, Study # 10, Study Name: Cedarless Flat

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
14.1	59.6 (15.1)	7.4	43.3	25.4	31.3	2.6	7.0	112.0	0.6

Stoniness Index



PELLET GROUP FREQUENCY --

Herd unit 25A, Study no: 10

Type	Quadrat Frequency 09	Pellet Transect Days Use/Acre (ha) 09
Rabbit	9	n/a
Elk	6	21(52)
Deer	8	7(17)
Cattle	3	4(10)

BROWSE CHARACTERISTICS --

Herd unit 25A, Study no: 10

A Y G R E	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
	1	2	3	4	5	6	7	8	9	1	2	3	4				
Artemisia nova																	
M	85	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	99	4	-	-	-	-	-	-	-	-	4	-	-	-	80	6	15
% Plants Showing		<u>Moderate Use</u>				<u>Heavy Use</u>				<u>Poor Vigor</u>				<u>%Change</u>			
'85		00%				00%				00%							
'91		00%				00%				00%							
'99		00%				00%				00%							
Total Plants/Acre (excluding Dead & Seedlings)												'85	0	Dec:	-		
												'91	0		-		
												'99	80		-		

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Artemisia tridentata wyomingensis																		
S	85	6	2	-	-	-	-	-	-	-	8	-	-	-	533			8
	91	12	-	1	-	-	-	1	-	-	13	-	1	-	933			14
	99	2	-	-	-	-	-	-	-	-	2	-	-	-	40			2
Y	85	11	4	1	-	-	-	-	-	-	16	-	-	-	1066			16
	91	18	1	1	-	-	-	-	-	-	20	-	-	-	1333			20
	99	49	33	2	-	-	-	-	-	-	84	-	-	-	1680			84
M	85	47	26	6	-	-	-	-	-	-	79	-	-	-	5266	18	20	79
	91	44	18	2	1	-	-	-	-	-	65	-	-	-	4333	12	15	65
	99	39	101	37	-	-	-	-	-	-	177	-	-	-	3540	13	22	177
D	85	14	19	4	-	-	-	-	-	-	34	-	-	3	2466			37
	91	10	3	1	-	-	-	-	-	-	14	-	-	-	933			14
	99	-	6	2	1	2	-	-	-	-	3	-	-	8	220			11
X	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	320			16
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		37%			08%			02%			-25%							
'91		22%			04%			00%			-18%							
'99		52%			15%			03%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	8798	Dec:	28%			
												'91	6599		14%			
												'99	5440		4%			
Chrysothamnus viscidiflorus viscidiflorus																		
Y	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	99	9	1	-	-	-	1	-	-	-	11	-	-	-	220	7	12	11
D	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	-	1	-	-	-	-	-	-	-	-	-	-	1	20			1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		00%			00%			00%										
'91		00%			00%			00%			+73%							
'99		17%			08%			08%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	0	Dec:	0%			
												'91	66		0%			
												'99	240		8%			

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Gutierrezia sarothrae																		
S	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	5	-	-	-	-	-	-	-	-	5	-	-	-	100		5	
Y	85	2	-	-	-	-	-	-	-	-	2	-	-	-	133		2	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	110	-	-	-	-	-	-	-	-	110	-	-	-	2200		110	
M	85	7	-	-	-	-	-	-	-	-	7	-	-	-	466	8	4	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	99	102	-	-	-	-	-	-	-	-	102	-	-	-	2040	4	4	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		00%			00%			00%										
'91		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	599	Dec:	-			
												'91	0		-			
												'99	4240		-			
Opuntia spp.																		
S	85	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	2	-	-	-	-	-	-	-	-	2	-	-	-	133		2	
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	91	3	-	-	-	-	-	1	-	-	4	-	-	-	266	2	4	
	99	3	-	-	-	-	-	-	-	-	3	-	-	-	60	3	10	
D	85	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		00%			00%			00%			+83%							
'91		00%			00%			00%			-80%							
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	66	Dec:	100%			
												'91	399		0%			
												'99	80		0%			

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.	Total
		1	2	3	4	5	6	7	8	9	1	2	3	4			
Pediocactus simpsonii																	
Y	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0
	99	2	-	-	-	-	-	-	-	-	2	-	-	-	40	2	2
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'85		00%			00%			00%									
'91		00%			00%			00%									
'99		00%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)													'85	0	Dec:	-	
													'91	0		-	
													'99	60		-	

Trend Study 25A-11-99

Study site name: Forsyth Reservoir .

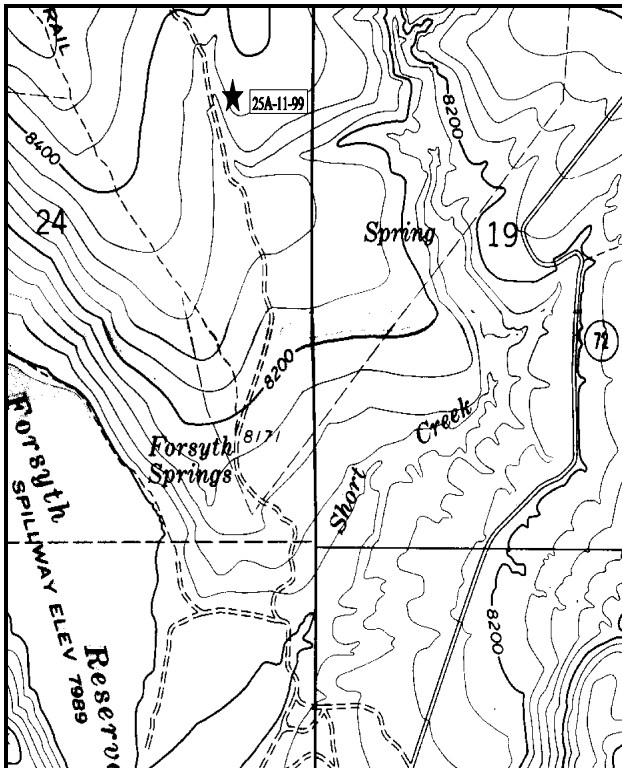
Range type: Black Sagebrush .

Compass bearing: frequency baseline 165°M.

Footmark (first frame at) 5 feet, footmarks (frequency belts) line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

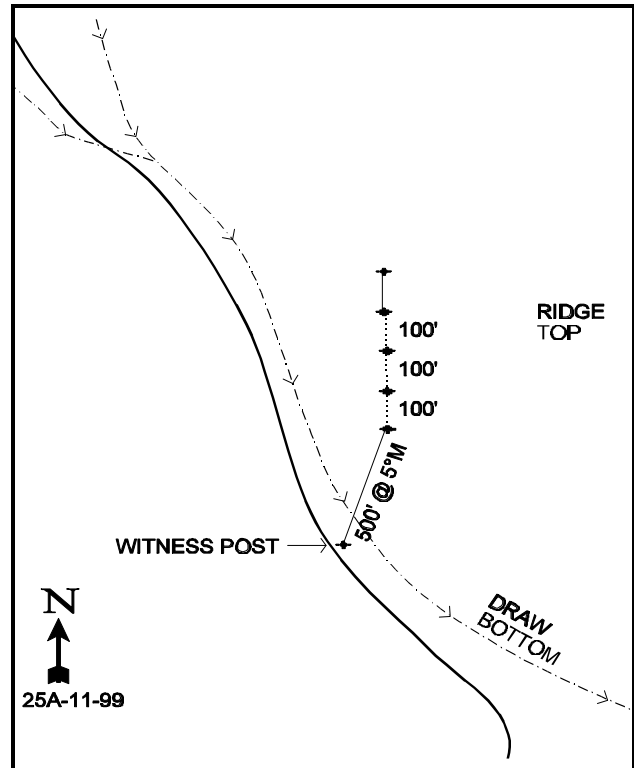
LOCATION DESCRIPTION

Between Lyman and Loa, turn north towards Fremont to connect with SR 72. Travel up SR 72 until you cross a Forest Service boundary cattleguard (about 5 miles from Fremont). Continue another 2.7 miles to Forsyth Reservoir. Turn at the Forsyth Reservoir sign and drive down 0.3 miles to a fork. Turn right and continue 0.1 miles to where the road crosses Short Creek (which empties into the east cove of Forsyth). From Short Creek, go up 0.1 miles to a fork. Turn right and go 0.25 miles to a cattleguard. Continue 0.15 miles beyond the cattleguard to a fork. Take the right fork and go 0.55 miles to a draw below a ridge to the northeast. There is a steel rebar witness post on the right side of the road. The last baseline stake is located 500 feet away at a bearing of 5°M on top of the ridge. The 0-foot baseline stake is 400 feet due north, and has a red browse tag #7062 attached.



Map Name: Forsyth Reservoir, Utah

Township 26S , Range 3E , Section 24



Diagrammatic Sketch

UTM 4265581.540 N, 454183.784 E

DISCUSSION

Trend Study No. 25A-11 (44-5)

The Forsyth Reservoir study site transect is located on the top of a hill north of Forsyth Reservoir. The slope is 5% with a south-southwest aspect and an elevation of 8,400 feet. The area is managed by the Fish Lake National Forest as part of the Tidwell cattle allotment. Historically, the area has received heavy grazing by cattle and sheep, but with an especially high impact within the vicinity of the reservoir. A large area was sprayed with 2,4-D in the spring of 1976 to reduce shrub competition and release the grasses and forbs. A drought after the spraying impaired growth, but five years after the spraying it was noted by Forest Service personnel that there was fair grass production with good vigor. The study site is currently dominated by black sagebrush. The area is still used by cattle every other year in early June, and is used by deer and elk in the winter. Pellet group data from 1999 estimate 2 deer, 60 elk, and 7 cow days use/acre (5 ddu/ha, 148 edu/ha, 17 cdu/ha). Cattle pats and about 70% of the elk pellet groups were from this spring ('99).

Soil on the site is moderately deep with an effective rooting depth estimated at just over 14 inches. Texture is a clay loam with a neutral pH (7.0). Phosphorus is low at only 2.6 ppm. Values less than 10 ppm have been shown to limit normal plant growth and development. Rock and pavement cover are relatively high on the surface and the profile contains abundant gravel. Litter cover is limited, but percent bare soil is low ranging from 1 to 4% since 1985. The soil appears to absorb and hold water well and the layer of pavement effectively stops erosion.

The dominant browse on the site is black sagebrush which currently ('99) provides 91% of the total browse cover. It has an extremely high density ranging from 15,466 plants/acre in 1985 to 28,180 by 1999. Use of the black sagebrush has been light to moderate with each reading and vigor has remained good. Percent decadence has steadily increased from 9% in 1985 to 29% in 1999. Many of the decadent plants encountered in 1999 were young plants with partial crown death likely due to drought and winter injury, combined with intraspecific competition. The current density appears to be near the maximum for this site. There are some scattered mountain big sagebrush plants on the site, which are more heavily hedged.

Other common shrubs found on the site include fringed sage and stickyleaf low rabbitbrush. Density of fringed sage and stickyleaf low rabbitbrush declined considerable between 1991 and 1999, but most of the change is due to the much larger sample used in 1999. These low growing shrubs show light use and good vigor.

The herbaceous understory is diverse yet not particularly abundant considering the treatment. Grasses currently ('99) produce only 7% cover, while forbs provide only 1%. The dominant grass is the warm season blue grama which provides 36% of the grass cover. Mutton bluegrass and letterman needlegrass are also fairly abundant. Forbs are limited to a few low growing, poor value species like rockcress, low fleabane, and longleaf phlox.

1985 APPARENT TREND ASSESSMENT

The soil appeared stable. Spraying has made this a dynamic vegetative community with many changes occurring. Grasses, as well as the key species black sage, are doing well and increasing. The Forest Service has recommendations to re-spray the sagebrush by 1990. However, additional seeding and further restrictions on cattle grazing may be necessary in order to improve the site for cool season herbaceous species and spring use by wildlife and cattle.

1991 TREND ASSESSMENT

The soil is still stable, with only 1% bare ground at this time. Fringed sagebrush and stickyleaf low

rabbitbrush have increased in density. The key species, black sagebrush, also increased in density by 27%. The herbaceous understory has remained about the same, with few changes.

TREND ASSESSMENT

soil - stable

browse - improving

herbaceous understory - stable

1999 TREND ASSESSMENT

Trend for soil is still considered stable even with the slight increase in bare soil, as it is still very low at only about 4%. The soil surface is still covered with pavement which provides adequate protection and erosion is not currently a problem. Trend for browse is stable for the key species, black sagebrush. Some of the changes in density of shrubs between 1991 and 1999 is the result of the larger sample used in 1999. Black sagebrush displays light to moderate use, good vigor, and excellent recruitment. The population currently appears to be at the maximum for the site. The dramatic decline in density of fringed sagebrush and stickleaf low rabbitbrush also appears to be the result of the larger sample used this year which gives a more representative sample of shrub populations with discontinuous distributions. Trend for the herbaceous understory is down slightly. Sum of nested frequency for perennial grasses has declined slightly, while frequency of perennial forbs has dropped considerably. Sum of nested frequency for blue grama declined slightly with frequency of bottlebrush squirreltail declining significantly. Forbs are limited to a few low growing, poor value species like rockcress, low fleabane, and longleaf phlox.

TREND ASSESSMENT

soil - stable

browse - stable

herbaceous understory - down slightly

HERBACEOUS TRENDS --

Herd unit 25A, Study no: 11

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover % '99
		'85	'91	'99	'85	'91	'99	
G	Agropyron trachycaulum	14	4	9	7	2	4	.04
G	Bouteloua gracilis	_a 140	_b 184	_{ab} 166	64	74	67	2.44
G	Carex spp.	_a 6	_a 6	_b 33	3	2	14	.14
G	Poa fendleriana	102	113	120	49	47	56	2.00
G	Sitanion hystrix	_b 156	_b 161	_a 85	63	66	36	.66
G	Stipa comata	_a 1	_a -	_b 35	1	-	14	.37
G	Stipa lettermani	102	102	85	42	42	41	1.14
Total for Annual Grasses		0	0	0	0	0	0	0
Total for Perennial Grasses		521	570	533	229	233	232	6.82
Total for Grasses		521	570	533	229	233	232	6.82
F	Androsace septentrionalis (a)	-	-	3	-	-	2	.03
F	Arabis demissa	_c 143	_b 74	_a 25	61	36	11	.05
F	Astragalus lentiginosus	3	-	-	1	-	-	-

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover % 09
		'85	'91	'99	'85	'91	'99	
F	Chaenactis douglasii	_a 2	_b 14	_a 3	1	8	1	.00
F	Erigeron pumilus	_c 137	_b 110	_a 66	58	49	29	.19
F	Hymenoxys richardsonii	_a 1	_a -	_b 17	1	-	9	.70
F	Pedicularis centranthera	-	-	1	-	-	1	.00
F	Penstemon spp.	_a -	_{ab} 1	_b 9	-	1	4	.02
F	Phlox austromontana	-	-	2	-	-	2	.01
F	Phlox longifolia	_b 60	_{ab} 33	_a 19	27	16	11	.05
F	Senecio multilobatus	_a -	_{ab} 3	_b 10	-	2	5	.02
Total for Annual Forbs		0	0	3	0	0	2	0.03
Total for Perennial Forbs		346	235	152	149	112	73	1.07
Total for Forbs		346	235	155	149	112	75	1.11

Values with different subscript letters are significantly different at $\alpha = 0.10$ (annuals excluded)

BROWSE TRENDS --

Herd unit 25A, Study no: 11

Type	Species	Strip Frequency 09	Average Cover % 09
B	Artemisia frigida	31	.16
B	Artemisia nova	96	19.44
B	Artemisia tridentata vaseyana	2	-
B	Chrysothamnus nauseosus	1	-
B	Chrysothamnus viscidiflorus viscidiflorus	29	1.60
B	Cowania mexicana stansburiana	0	-
B	Coryphantha vivipara arizonica	2	.06
B	Eriogonum microthecum	9	.03
B	Gutierrezia sarothrae	4	.01
B	Leptodactylon pungens	2	-
B	Pediocactus simpsonii	2	.03
B	Pinus edulis	1	-
B	Tetradymia canescens	1	-
Total for Browse		180	21.35

BASIC COVER --

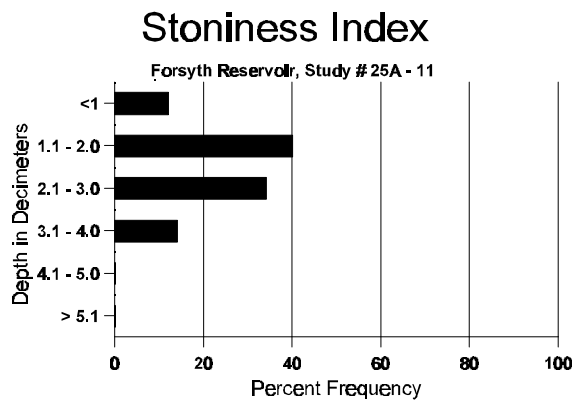
Herd unit 25A, Study no: 11

Cover Type	Nested Frequency 09	Average Cover %		
		'85	'91	'99
Vegetation	321	5.75	10.75	32.02
Rock	313	6.25	2.75	14.71
Pavement	361	49.50	57.00	38.54
Litter	285	32.00	27.75	7.75
Cryptogams	169	4.75	.75	1.71
Bare Ground	177	1.75	1.00	3.56

SOIL ANALYSIS DATA --

Herd Unit 25A, Study # 11, Study Name: Forsyth Reservoir

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
14.4	53.8 (15.6)	7.0	41.3	35.4	23.3	2.2	2.6	89.6	0.5



PELLET GROUP FREQUENCY --

Herd unit 25A, Study no: 11

Type	Quadrat Frequency 09	Pellet Transect Days Use/Acre (ha) 09
Rabbit	6	n/a
Elk	19	60(148)
Deer	5	2(5)
Cattle	2	7(17)

BROWSE CHARACTERISTICS --

Herd unit 25A, Study no: 11

Field unit 25A, Study no. 11																	
A G R E	Y	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.	Total
		1	2	3	4	5	6	7	8	9	1	2	3	4			
Artemisia frigida																	
S	85	73	-	-	-	-	-	-	-	-	73	-	-	-	4866		73
	91	3	-	-	-	-	-	-	-	-	3	-	-	-	200		3
	99	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2
Y	85	208	-	-	-	-	-	-	-	-	208	-	-	-	13866		208
	91	38	11	-	-	-	-	-	-	-	49	-	-	-	3266		49
	99	13	1	-	-	-	-	-	-	-	14	-	-	-	280		14
M	85	140	-	-	-	-	-	-	-	-	140	-	-	-	9333	2 4	140
	91	100	72	36	24	1	-	1	-	-	234	-	-	-	15600	2 3	234
	99	85	8	-	5	-	-	-	-	-	98	-	-	-	1960	4 6	98
D	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	91	10	7	6	-	-	-	-	-	-	21	-	-	2	1533		23
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'85		00%			00%			00%			-12%						
'91		30%			14%			.65%			-89%						
'99		08%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)												'85	23199	Dec:	0%		
												'91	20399		8%		
												'99	2240		0%		
Artemisia nova																	
S	85	142	-	-	-	-	-	-	-	-	142	-	-	-	9466		142
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	99	6	-	-	-	-	-	-	-	-	6	-	-	-	120		6
Y	85	85	1	-	-	-	-	-	-	-	86	-	-	-	5733		86
	91	116	19	3	5	-	-	15	-	-	157	-	1	-	10533		158
	99	271	109	2	-	-	-	-	-	-	382	-	-	-	7640		382
M	85	95	27	3	-	-	-	-	-	-	125	-	-	-	8333	7 10	125
	91	38	19	18	40	2	-	-	-	-	102	15	-	-	7800	6 11	117
	99	379	215	-	-	18	-	-	-	-	612	-	-	-	12240	7 16	612
D	85	5	15	1	-	-	-	-	-	-	20	-	-	1	1400		21
	91	23	6	2	11	-	-	-	-	-	27	1	-	14	2800		42
	99	228	128	3	-	52	4	-	-	-	384	-	-	31	8300		415
X	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	720		36
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'85		19%			02%			.43%			+27%						
'91		15%			07%			05%			+25%						
'99		37%			.63%			02%									
Total Plants/Acre (excluding Dead & Seedlings)												'85	15466	Dec:	9%		
												'91	21133		13%		
												'99	28180		29%		

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Artemisia tridentata vaseyana																		
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	99	-	1	1	-	-	-	-	-	-	-	2	-	-	40	11	25	2
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
		'85			00%			00%			00%							
		'91			00%			00%			00%							
		'99			50%			50%			00%							
Total Plants/Acre (excluding Dead & Seedlings)												'85	0	Dec:	-			
												'91	0		-			
												'99	40		-			
Chrysanthamnus nauseosus																		
M	85	1	-	-	-	-	-	-	-	-	1	-	-	-	66	2	2	1
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	99	-	-	1	-	-	-	-	-	-	-	1	-	-	20	7	9	1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
		'85			00%			00%			00%							
		'91			00%			00%			00%							
		'99			00%			100%			00%							
Total Plants/Acre (excluding Dead & Seedlings)												'85	66	Dec:	-			
												'91	0		-			
												'99	20		-			
Chrysanthamnus viscidiflorus viscidiflorus																		
S	85	12	-	-	-	-	-	-	-	-	12	-	-	-	800			12
	91	2	-	-	-	-	-	-	-	-	2	-	-	-	133			2
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	85	43	-	-	-	-	-	-	-	-	43	-	-	-	2866			43
	91	17	8	2	1	-	-	3	-	-	31	-	-	-	2066			31
	99	4	-	1	-	-	-	-	-	-	5	-	-	-	100			5
M	85	130	-	-	-	-	-	-	-	-	129	-	1	-	8666	7	8	130
	91	80	23	8	1	-	-	3	-	-	109	2	2	2	7666	3	4	115
	99	84	2	-	-	-	-	-	-	-	86	-	-	-	1720	6	11	86
D	85	3	-	-	-	-	-	-	-	-	3	-	-	-	200			3
	91	22	3	6	2	-	-	-	-	-	29	1	1	2	2200			33
	99	4	-	-	-	-	-	-	-	-	2	-	-	2	80			4
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
		'85			00%			.56%			+ 2%							
		'91			19%			09%			-84%							
		'99			02%			01%			02%							
Total Plants/Acre (excluding Dead & Seedlings)												'85	11732	Dec:	2%			
												'91	11932		18%			
												'99	1900		4%			

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.	Total
		1	2	3	4	5	6	7	8	9	1	2	3	4			
Cowania mexicana stansburiana																	
S	85	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'85		00%			00%			00%									
'91		00%			00%			00%									
'99		00%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)												'85	0	Dec:	-		
												'91	0		-		
												'99	0		-		
Coryphantha vivipara arizonica																	
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0
	99	6	-	-	-	-	-	-	-	-	6	-	-	-	120	1	6
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'85		00%			00%			00%									
'91		00%			00%			00%									
'99		00%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)												'85	0	Dec:	-		
												'91	0		-		
												'99	120		-		
Eriogonum microthecum																	
Y	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	91	1	1	-	-	-	-	-	-	-	1	1	-	-	133		2
	99	1	1	-	-	-	-	-	-	-	2	-	-	-	40		2
M	85	1	-	-	-	-	-	-	-	-	1	-	-	-	66	5	1
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0
	99	6	1	-	-	-	-	-	-	-	7	-	-	-	140	5	7
D	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	91	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1
	99	-	2	-	-	-	-	-	-	-	-	-	-	2	40		2
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'85		00%			00%			00%			+67%						
'91		33%			00%			00%			+10%						
'99		36%			00%			18%									
Total Plants/Acre (excluding Dead & Seedlings)												'85	66	Dec:	0%		
												'91	199		33%		
												'99	220		18%		

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Gutierrezia sarothrae																		
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	99	4	-	-	-	-	-	-	-	-	4	-	-	-	80	6	7	4
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		00%			00%			00%										
'91		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	0	Dec:	-			
												'91	0		-			
												'99	80		-			
Leptodactylon pungens																		
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	99	6	-	-	-	-	-	-	-	-	6	-	-	-	120	7	9	6
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		00%			00%			00%										
'91		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	0	Dec:	-			
												'91	0		-			
												'99	120		-			
Pediocactus simpsonii																		
Y	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20	1	3	1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		00%			00%			00%										
'91		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	0	Dec:	-			
												'91	0		-			
												'99	40		-			

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.	Total
		1	2	3	4	5	6	7	8	9	1	2	3	4			
Pinus edulis																	
S	85	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
Y	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'85		00%			00%			00%									
'91		00%			00%			00%									
'99		00%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)												'85	0	Dec:	-		
												'91	0		-		
												'99	20		-		
Tetradymia canescens																	
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20	7 10	1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'85		00%			00%			00%									
'91		00%			00%			00%									
'99		00%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)												'85	0	Dec:	-		
												'91	0		-		
												'99	20		-		

Trend Study 25A-12-99

Study site name: East Tidwell.

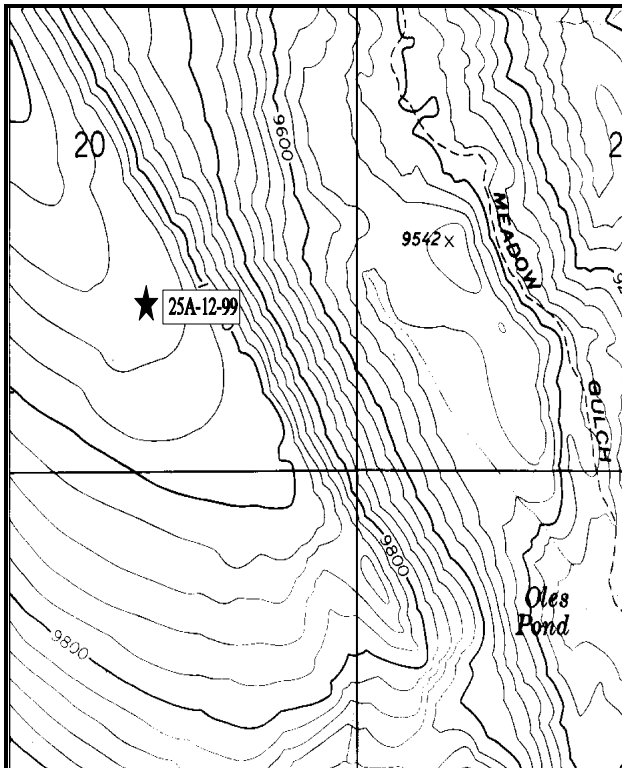
Range type: Alpine-Mixed.

Compass bearing: frequency baseline 173°M.

Footmark (first frame at) 5 feet, footmarks (frequency belts) line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

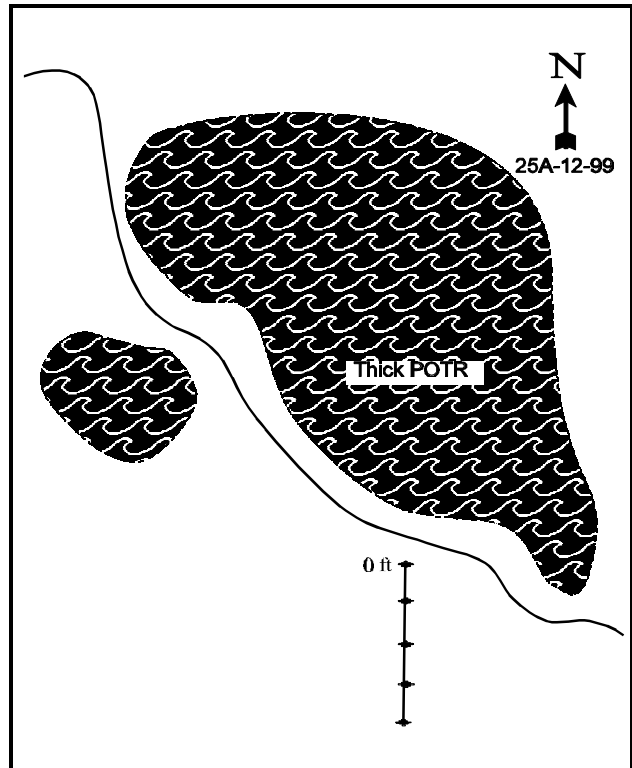
LOCATION DESCRIPTION

Traveling north on U-72 from Fremont, turn west on Forest Service road #018 (between the cattleguard and mile marker #16). Go 0.6 miles (crossing a cattleguard) to a fork in the road, go right. One-half mile later you'll come to a "T" in the road, stay to the left. Go 2.0 miles and turn right at a fork that goes up a steep hill. After 0.1 miles there is a faint intersection. Stay on the main road heading north for 0.9 miles to a gate. Go through the gate and go 0.2 miles to a fork in the road. Stay to the right and go through a grove of trees, up a steep and rocky road. Here the road becomes very faint, but travel 1.2 miles to a witness post. The 0 foot baseline stake is easy to see, and has browse tag #9078 attached.



Map Name: Geyser Peak

Township 25S, Range 4E, Section 20



Diagrammatic Sketch

UTM 4273874.295 N, 456599.828 E

DISCUSSION

Trend Study No. 25A-12 (44-6)

This study site, East Tidwell, was established in 1991. It is located on a 12% southwest facing slope at an elevation of 10,000 feet. The plant community consists entirely of low growing shrubs, forbs, and grasses. The area is grazed by cattle and used heavily by elk. It is within the Solomon allotment which is grazed by cattle on a deferred rotation. On odd numbered years, grazing occurs from August 20 to September 20, and on even numbered years, it is grazed from September 20 to October 31. Pellet group data from 1999 estimate 15 deer and 68 elk days use/acre (37 ddu/ha and 168 edu/ha). Nearly all of the deer and about 75% of the elk pellet groups were from this spring or early summer (1999). No recent cattle use was evident. There is a water trough about 600 feet south of the site which is fed by a pipe that goes to a fenced spring about one-half mile to the north. There was no water in the trough during the 1999 reading and it appeared that the pipe was not functioning.

Soil at the site is well drained and deep with an effective rooting depth of 16 inches. Rock and especially pavement are abundant on the surface. The profile contains mostly gravel sized rock with larger rock concentrated at 10 to 12 inches in depth. Texture of the soil is a loam with a slightly alkaline pH (7.5). Parent material is basalt. Bare ground is low due to the well armored nature of the soil surface. Erosion is slight and there are no active gullies in the area.

Browse on the site consists mainly of Parry rabbitbrush which currently ('99) accounts for 68% of the shrub cover. Several other shrubs including; black sagebrush, mountain big sagebrush, low rabbitbrush, and gray horsebrush, which occur in relatively small numbers. Parry rabbitbrush is very abundant with an estimated density of 38,865 plants/acre in 1991 declining to 13,140 in 1999. Since only a few dead plants were encountered in 1999, the change in density is due to the much larger sample used in 1999 which gives a significantly more representative estimate of shrub densities that have distributions that are clumped or discontinuous. It also appears that the stickyleaf low rabbitbrush (*Chrysothamnus viscidiflorus viscidiflorus*) sampled in 1999 was called Parry rabbitbrush (*Chrysothamnus parryi*) in 1991. The Parry rabbitbrush population is currently ('99) mostly mature with light use, good vigor, and low decadence. Mature shrubs are small measuring only 5 inches high with an 8 crown.

The only other common browse on the site include are fringed sagebrush and gray horsebrush. The fringed sagebrush is mostly unutilized, while the gray horsebrush has received moderate to heavy use in 1991 and mostly light use in 1999. There are a few scattered black and mountain big sagebrush plants on the site. They do not appear to be used.

Due to the high elevation of this site, the herbaceous understory is the key forage source for big game and livestock in this area. Grasses and forbs are diverse and moderately abundant. Twelve species of grasses were sampled in 1999. Four species, prairie Junegrass, mutton bluegrass, bottlebrush squirreltail, and letterman needlegrass, are common and combined together provide 86% of the grass cover. No utilization was noted on the grasses in 1999. Forbs are also diverse with 28 species encountered in 1999. All forbs combined currently produce 14% cover compared to 9% for grasses. There are several useful species on the site, although many of the common forbs are low growing less desirable types such as pussytoes, low fleabane, Eaton fleabane, trailing fleabane, pingue hymenoxys, and elegant cinquefoil. Some of the paintbrush and bastard toadflax had been utilized in 1999.

1991 APPARENT TREND ASSESSMENT

With the high rock cover on the soil, it is unlikely that there will be erosion problems in the future. Overstory is mostly a consistent population of rabbitbrush. There is a diversity of grasses and forbs but only a few shrubs. Because of the high diversity, the site will most likely be able to recover from stressful ecological events, but could be compromised because of the high density of rabbitbrush.

1999 TREND ASSESSMENT

Trend for soil is stable. Percent cover of bare ground declined but litter cover also declined from 22% to only 6%. The soil surface is well protected by vegetation and pavement and erosion does not appear to be a problem. Shrubs are not a particularly important component on this high elevation site. Trend for browse appears stable for the key species, Parry rabbitbrush. The decline in density since 1991 is due to a combination of the much larger sample used in 1999 and misidentification of low rabbitbrush in 1991. The population is mostly mature, lightly browsed, and in good vigor. The key vegetational component at this elevation is the herbaceous understory, especially the forbs. Trend for the herbaceous understory is stable for grasses and down slightly for forbs. Overall, the herbaceous trend is considered down slightly.

TREND ASSESSMENT

soil - stable

browse - stable

herbaceous understory - down slightly

HERBACEOUS TRENDS --

Herd unit 25A, Study no: 12

Type	Species	Nested Frequency		Quadrat Frequency		Average Cover %
		'91	'99	'91	'99	
G	Agropyron trachycaulum	-	*24	-	10	.32
G	Bouteloua gracilis	24	14	9	6	.03
G	Carex spp.	49	*9	20	6	.10
G	Festuca ovina	59	77	28	31	.70
G	Koeleria cristata	132	159	56	67	2.15
G	Poa fendleriana	89	*169	38	71	2.90
G	Poa secunda	-	1	-	1	.03
G	Sitanion hystrix	128	*84	52	36	1.22
G	Stipa comata	-	*10	-	6	.06
G	Stipa lettermani	184	*68	77	31	1.35
Total for Annual Grasses		0	0	0	0	0
Total for Perennial Grasses		665	615	280	265	8.88
Total for Grasses		665	615	280	265	8.88
F	Agoseris glauca	46	*20	20	11	.15
F	Antennaria rosea	70	62	29	23	1.21
F	Androsace septentrionalis (a)	-	31	-	16	.11
F	Aster spp.	38	*7	16	3	.01
F	Astragalus spp.	76	*55	35	24	1.55
F	Chaenactis douglasii	5	7	3	3	.01
F	Comandra pallida	-	*9	-	5	.10
F	Delphinium spp.	2	-	1	-	-
F	Eriogonum alatum	-	*5	-	3	.06
F	Erigeron eatonii	7	14	3	6	.32

Type	Species	Nested Frequency		Quadrat Frequency		Average Cover %
		'91	'99	'91	'99	
F	Erigeron flagellaris	-	5	-	2	.01
F	Erigeron pumilus	5	*56	4	22	1.10
F	Eriogonum umbellatum	19	29	10	14	.52
F	Gentiana calycosa	34	*121	15	57	1.90
F	Geranium caespitosum	174	*-	67	-	-
F	Hymenoxys richardsonii	82	68	39	36	1.59
F	Ivesia gordonii	29	*6	15	3	.04
F	Lesquerella wardii	58	*13	27	6	.05
F	Linum lewisii	22	*56	9	25	.86
F	Lupinus spp.	4	7	1	3	.39
F	Lychnis drummondii	-	*13	-	7	.06
F	Machaeranthera canescens	90	*7	38	4	.07
F	Oxytropis spp.	14	45	9	17	.49
F	Penstemon spp.	95	80	42	41	.43
F	Phlox longifolia	121	*49	60	23	.17
F	Potentilla concinna	134	*39	61	18	.75
F	Polygonum douglasii (a)	-	2	-	1	.00
F	Potentilla gracilis	-	*26	-	12	.06
F	Senecio multilobatus	41	*158	21	68	1.60
F	Taraxacum officinale	26	14	14	10	.10
F	Unknown forb-perennial	2	-	1	-	-
Total for Annual Forbs		0	33	0	17	0.11
Total for Perennial Forbs		1194	971	540	446	13.69
Total for Forbs		1194	1004	540	463	13.80

* Indicates significant difference at % = 0.10 (annuals excluded)

BROWSE TRENDS --

Herd unit 25A, Study no: 12

Type	Species	Strip Frequency '99	Average Cover % '99
B	Artemisia frigida	40	.37
B	Artemisia nova	5	.53
B	Artemisia tridentata vaseyana	2	.15
B	Chrysothamnus parryi	81	5.82
B	Chrysothamnus viscidiflorus viscidiflorus	47	.71
B	Gutierrezia sarothrae	27	.06
B	Symphoricarpos oreophilus	1	-
B	Tetradymia canescens	43	.95
Total for Browse		246	8.61

BASIC COVER --

Herd unit 25A, Study no: 12

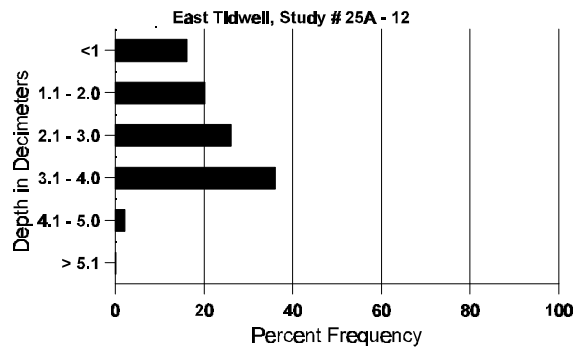
Cover Type	Nested Frequency '99	Average Cover % '91 '99	
Vegetation	341	10.50	30.06
Rock	300	13.25	10.85
Pavement	348	44.25	43.96
Litter	297	22.25	6.19
Cryptogams	49	.25	.18
Bare Ground	159	9.50	4.02

SOIL ANALYSIS DATA --

Herd Unit 25A, Study # 12, Study Name: East Tidwell

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
16.0	48.8 (16.8)	7.5	47.3	29.4	23.3	3.1	21.0	166.4	0.6

Stoniness Index



PELLET GROUP FREQUENCY --

Herd unit 25A, Study no: 12

Type	Quadrat Frequency 09	Pellet Transect Days Use/Acre (ha) 09
Rabbit	12	n/a
Elk	37	68(168)
Deer	17	15(37)
Cattle	2	1(2)

BROWSE CHARACTERISTICS --

Herd unit 25A, Study no: 12

A Y G R E	Form Class (No. of Plants)										Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
	1	2	3	4	5	6	7	8	9	1	2	3	4					
Artemisia frigida																		
S	91	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	99	3	-	-	-	-	-	1	-	-	4	-	-	-	80		4	
Y	91	10	2	1	1	-	-	-	-	-	14	-	-	-	933		14	
	99	32	-	-	-	-	-	-	-	-	32	-	-	-	640		32	
M	91	2	1	-	-	-	-	-	-	-	3	-	-	-	200	2	5	
	99	191	3	-	-	-	-	-	-	-	194	-	-	-	3880	5	7	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'91		18%			06%			00%			+75%							
'99		01%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'91	1133	Dec:	-			
												'99	4520		-			
Artemisia nova																		
Y	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
M	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	99	5	-	-	-	-	-	-	-	-	5	-	-	-	100	10	28	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'91		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'91	0	Dec:	-			
												'99	140		-			
Artemisia tridentata vaseyana																		
M	91	1	1	3	-	-	-	-	-	-	5	-	-	-	333	4	5	
	99	1	1	-	-	-	-	-	-	-	2	-	-	-	40	8	20	
D	91	-	-	1	-	-	-	-	-	-	1	-	-	-	66		1	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'91		17%			67%			00%			-90%							
'99		50%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'91	399	Dec:	17%			
												'99	40		0%			

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Chrysothamnus parryi																		
S	91	65	-	-	-	-	-	-	-	-	64	1	-	-	4333		65	
	99	6	-	-	-	-	-	-	-	-	6	-	-	-	120		6	
Y	91	95	56	10	-	-	-	-	-	-	151	9	-	1	10733		161	
	99	61	-	-	-	-	-	-	-	-	61	-	-	-	1220		61	
M	91	98	105	48	3	1	1	-	-	-	244	10	1	1	17066	4	6	
	99	570	-	-	-	-	-	-	-	-	570	-	-	-	11400	5	8	
D	91	41	45	33	10	1	35	1	-	-	137	5	-	24	11066		166	
	99	20	5	-	1	-	-	-	-	-	17	-	-	9	520		26	
X	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	60		3	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'91		36%			22%			05%			-66%							
'99		.76%			00%			01%										
Total Plants/Acre (excluding Dead & Seedlings)												'91	38865	Dec:	28%			
												'99	13140		4%			
Chrysothamnus viscidiflorus viscidiflorus																		
Y	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	11	-	-	-	-	-	-	-	-	11	-	-	-	220		11	
M	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
	99	94	-	-	1	-	-	-	-	-	95	-	-	-	1900	5	9	
D	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	4	-	1	-	-	-	-	-	-	1	-	-	4	100		5	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'91		00%			00%			00%										
'99		00%			.90%			04%										
Total Plants/Acre (excluding Dead & Seedlings)												'91	0	Dec:	0%			
												'99	2220		5%			
Gutierrezia sarothrae																		
S	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	1	-	-	-	-	-	-	-	-	-	-	1	-	20		1	
Y	91	3	-	-	-	1	-	-	-	-	4	-	-	-	266		4	
	99	5	-	-	-	-	-	-	-	-	5	-	-	-	100		5	
M	91	5	-	-	-	-	-	-	-	-	5	-	-	-	333	3	3	
	99	43	-	-	-	-	-	-	-	-	42	1	-	-	860	4	6	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'91		11%			00%			00%			+38%							
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'91	599	Dec:	-			
												'99	960					

A G E	Y G R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Symphoricarpos oreophilus																		
M	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	99	-	-	-	-	1	-	-	-	-	1	-	-	-	20	8	30	1
% Plants Showing		<u>Moderate Use</u>				<u>Heavy Use</u>				<u>Poor Vigor</u>				<u>%Change</u>				
'91		00%				00%				00%								
'99		100%				00%				00%								
Total Plants/Acre (excluding Dead & Seedlings)												'91	0	Dec:	-			
												'99	20		-			
Tetradymia canescens																		
S	91	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	99	4	-	-	-	-	-	-	-	-	4	-	-	-	80			4
Y	91	2	1	-	-	-	-	-	-	-	3	-	-	-	200			3
	99	31	-	-	-	-	-	-	-	-	31	-	-	-	620			31
M	91	2	5	2	-	-	1	-	-	-	10	-	-	-	666	4	5	10
	99	69	9	-	-	-	-	-	-	-	78	-	-	-	1560	6	9	78
D	91	3	2	1	-	-	1	-	-	-	6	-	-	1	466			7
	99	4	1	-	-	-	-	-	-	-	4	-	-	1	100			5
% Plants Showing		<u>Moderate Use</u>				<u>Heavy Use</u>				<u>Poor Vigor</u>				<u>%Change</u>				
'91		40%				25%				05%				+42%				
'99		09%				00%				.87%								
Total Plants/Acre (excluding Dead & Seedlings)												'91	1332	Dec:	35%			
												'99	2280		4%			

Trend Study 25A-13-99

Study site name: Ox Spring .

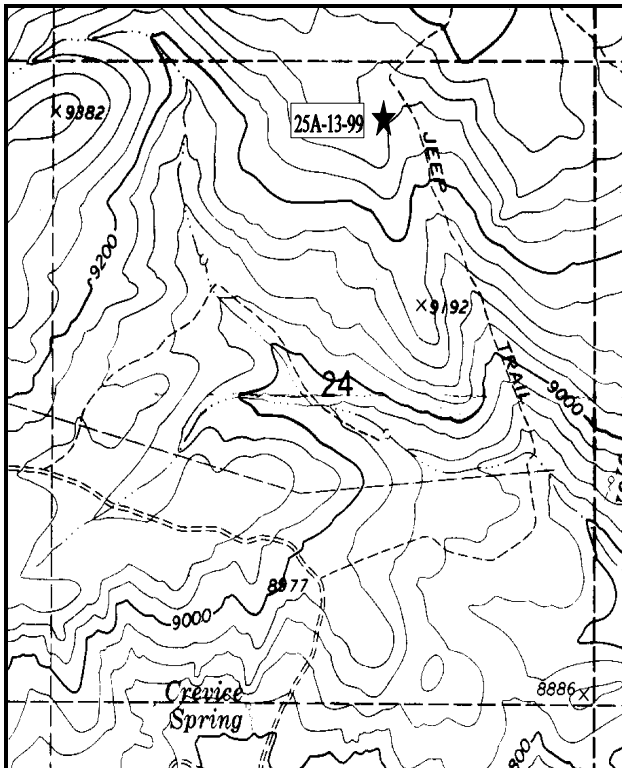
Range type: Burn .

Compass bearing: frequency baseline 165°M.

Footmark (first frame at) 5 feet, footmarks (frequency belts) line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

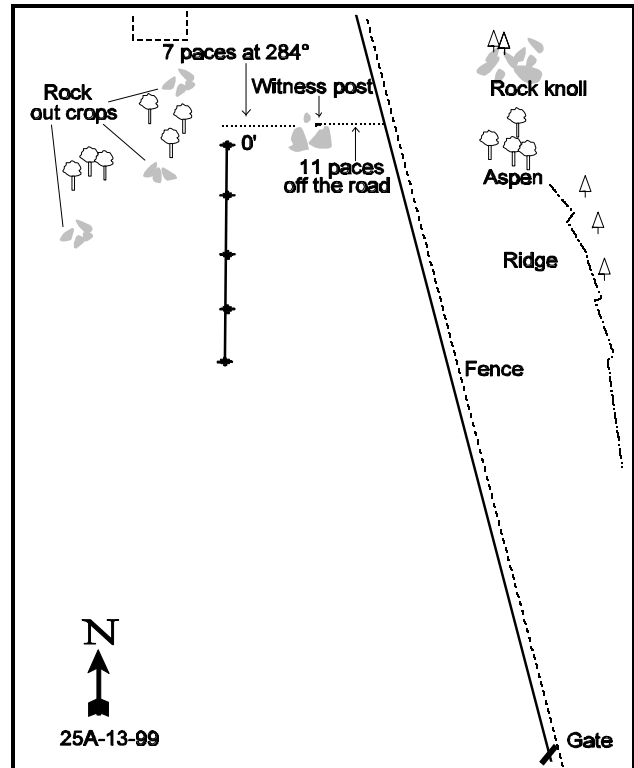
LOCATION DESCRIPTION

Turn west off of SR 72 onto the Mill Meadow Road north of Fremont. Go past the lake and up the Johnson Reservoir Road for 3.8 miles. Turn west off the paved road and go 1.1 miles to a cattleguard at the head of Cedarless Flat. Continue 0.6 miles to a fork in the road. Go right for 1.75 miles to the Ox Spring trail turnoff. Stay left (on the main road) for 1.15 miles to another cattleguard. Go another 1.05 miles to the Briggs Hollow turnoff. Stay right for 0.35 miles, turn right off the Mytoge Road, and go 0.5 miles to a gate. Drive another 0.85 miles (passing through two more gates) to a witness post among some rocks, 11 paces off the left (west) side of the road. From the witness post, the white-topped 0 foot baseline stake is 7 paces away at an azimuth of 284°M.



Map Name: Fish Lake, Utah

Township 26S , Range 2E , Section 24



Diagrammatic Sketch

UTM 4266169.993 N, 444051.066 E

DISCUSSION

Trend Study No. 25A-13 (44-7)

The Ox Spring site is a new study first read in 1991 near Ox Spring. It samples a prescribed burn on a high elevation mountain big sagebrush type with a 10-12% south-facing slope and an elevation of 9,300 feet. The land is administered by the U.S. Forest Service. The area is grazed by cattle during the summer as part of the UM allotment which is used in the spring. Pellet group data from a nearby Division pellet group transect estimated 19 deer and 46 elk days use/acre in 1991 (46 ddu/ha, 114 edu/ha). Elk use appeared heavy in the spring of 1991. An enclosure nearby is used to monitor spring elk utilization. Pellet group data taken along the study site baseline in 1999 estimate 9 deer, 97 elk and 25 cow days use/acre (22 ddu/ha, 240 edu/ha, and 62 cdu/ha). All of the cattle pats appeared to be from last season. Most elk pellet groups seemed to be from the spring.

The soil is moderately deep with an effective rooting depth of over 16 inches. It has a loam texture with a neutral pH (7.3). The soil is dark in color and fertile with a relatively high organic matter content of 5.2%. The surface horizon contains a high percentage of gravel sized rock fragments. Litter and pavement cover most of the bare areas leaving little exposed bare ground. Erosion does not appear to be a problem on this site due to uniform distribution of vegetation and litter cover.

The browse consists of mostly sprouting shrubs: woods rose, Oregon grape, and snowberry. Rabbitbrush was the most numerous species with an estimated 12,466 plants/acre, with light to moderate use 1991. Density declined to 7,240 plants/acre in 1999, due in part to the much larger sample now used which gives much more accurate estimates for browse species. The population is currently ('99) mostly mature with young plants making up 13% of the population. Mature plants have doubled in number since 1991. Utilization was moderate in 1991, but there was little sign of use in 1999. Some mountain big sagebrush and rubber rabbitbrush were encountered in 1999 with the larger sample size.

The site is dominated by native grasses and forbs which currently ('99) provide 72% of the total vegetation cover. The most numerous grass is mutton bluegrass which accounts for 45% of the grass cover. Other common species include bottlebrush squirreltail, prairie Junegrass, Carex, pinewoods needlegrass, and bluebunch wheatgrass. There were 25 species of forbs sampled in 1991 and 20 in 1999. The more common forbs include Watson penstemon, Lupine, aster, and rose pussytoes.

1991 APPARENT TREND ASSESSMENT

Overall, the soil trend appears stable. No recent erosion was evident and no active gullies occur on the site. Vegetation and litter cover appear sufficient to hold the soil in place. The only desirable browse, stickyleaf low rabbitbrush, has a large population with a good percentage of young plants. Native grasses and forbs are diverse and abundant.

1999 TREND ASSESSMENT

Trend for soil is stable. Percent cover of bare ground has declined but litter cover has also declined. There does not appear to be any problem with erosion on this site. Trend for browse is up slightly. Density of the increaser, stickyleaf low rabbitbrush has declined, while density of the more preferred mountain big sagebrush and white-stemmed rubber rabbitbrush have increased. However, shrubs are not the most important component on this site. Trend for the herbaceous understory is down slightly overall. Sum of nested frequency for grasses increased slightly, although frequency of forbs declined substantially. It appears that forb abundance is declining after a flush of growth following the fire.

TREND ASSESSMENT

soil - stable

browse - up slightly

herbaceous understory - up slightly for grasses, down for forbs, down slightly overall

HERBACEOUS TRENDS --

Herd unit 25A, Study no: 13

Type	Species	Nested Frequency		Quadrat Frequency		Average Cover %
		'91	'99	'91	'99	'99
G	Agropyron spp.	110	*-	47	-	-
G	Agropyron spicatum	-	*85	-	35	2.27
G	Agropyron trachycaulum	-	*48	-	18	.72
G	Bromus anomalus	-	*38	-	17	.60
G	Carex spp.	75	94	25	31	2.68
G	Koeleria cristata	129	125	54	45	2.82
G	Poa fendleriana	258	275	95	90	10.56
G	Sitanion hystrix	138	*102	55	45	1.87
G	Sporobolus cryptandrus	-	1	-	1	.03
G	Stipa comata	-	4	-	1	.03
G	Stipa pinetorum	78	65	35	-	1.81
Total for Annual Grasses		0	0	0	0	0
Total for Perennial Grasses		788	837	311	308	23.44
Total for Grasses		788	837	311	308	23.44
F	Agoseris glauca	74	*-	29	-	-
F	Antennaria rosea	105	124	46	49	5.07
F	Androsace septentrionalis (a)	-	84	-	38	.44
F	Arabis spp.	37	*-	18	-	-
F	Arabis drummondi	10	*-	6	-	-
F	Astragalus argophyllus	12	*-	6	-	-
F	Aster chilensis	80	*15	32	7	.30
F	Astragalus serpens	17	*-	11	-	-
F	Aster spp.	18	37	10	16	1.27
F	Astragalus spp.	6	*38	2	16	.22
F	Castilleja chromosa	6	-	2	-	-
F	Castilleja linariaefolia	4	7	2	4	.07
F	Crepis acuminata	41	*5	22	4	.02
F	Erigeron eatonii	18	*-	8	-	-
F	Erigeron pumilus	-	*8	-	3	.09
F	Eriogonum racemosum	57	74	25	30	1.66
F	Eriogonum umbellatum	8	6	5	5	.08

Type	Species	Nested Frequency		Quadrat Frequency		Average Cover % 09
		'91	'99	'91	'99	
F	Fritillaria atropurpurea	21	*-	10	-	-
F	Lotus utahensis	13	26	10	13	.50
F	Lupinus spp.	116	109	50	48	3.48
F	Lychnis drummondii	-	*9	-	5	.07
F	Machaeranthera canescens	1	2	1	1	.03
F	Penstemon watsonii	131	63	58	26	1.88
F	Phlox austromontana	4	-	2	-	-
F	Phlox longifolia	97	*-	48	-	-
F	Potentilla concinna	3	9	2	3	.33
F	Taraxacum officinale	69	79	28	40	1.31
F	Tragopogon dubius	-	1	-	1	.03
F	Unknown forb-perennial	2	-	1	-	-
F	Viguiera multiflora	-	1	-	1	.00
Total for Annual Forbs		0	84	0	38	0.43
Total for Perennial Forbs		950	613	434	272	16.46
Total for Forbs		950	697	434	310	16.90

* Indicates significant difference at % = 0.10 (annuals excluded)

BROWSE TRENDS --

Herd unit 25A, Study no: 13

Type	Species	Strip Frequency 09	Average Cover % 09
B	Artemisia tridentata vaseyana	5	-
B	Chrysothamnus nauseosus	24	.87
B	Chrysothamnus viscidiflorus viscidiflorus	88	13.89
B	Cowania mexicana stansburiana	0	-
B	Mahonia repens	2	.06
B	Rosa woodsii	6	.09
B	Symphoricarpos oreophilus	13	1.01
B	Tetradymia canescens	0	-
Total for Browse		138	15.93

BASIC COVER --

Herd unit 25A, Study no: 13

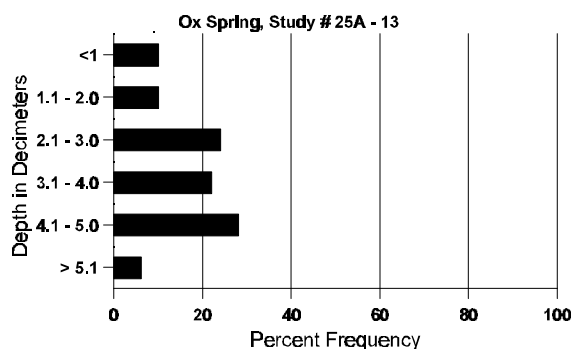
Cover Type	Nested Frequency '99	Average Cover % '91 '99	
Vegetation	373	17.00	56.81
Rock	188	7.00	5.75
Pavement	258	14.50	12.86
Litter	375	45.25	35.65
Cryptogams	-	0	0
Bare Ground	238	16.25	9.22

SOIL ANALYSIS DATA --

Herd Unit 25A, Study # 13, Study Name: Ox Spring

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
16.5	55.2 (16.5)	7.3	33.3	43.4	23.3	5.2	20.5	428.8	0.7

Stoniness Index



PELLET GROUP FREQUENCY --

Herd unit 25A, Study no: 13

Type	Quadrat Frequency '99	Pellet Transect Days Use/Acre (ha) '99
Rabbit	4	n/a
Horse	1	0
Elk	57	97(240)
Deer	7	9(22)
Cattle	8	25(62)

BROWSE CHARACTERISTICS --

Herd unit 25A, Study no: 13

Field Unit 25A, Study No. 15																		
A G R E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Artemisia tridentata vaseyana																		
Y	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	4	-	-	-	-	-	-	-	-	-	4	-	-	80			4
M	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	99	4	-	-	-	-	-	-	-	-	-	4	-	-	80	22	38	4
X	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	3260			163
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'91		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'91	0	Dec:	-			
												'99	160		-			
Chrysothamnus nauseosus																		
M	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	99	46	2	-	-	-	-	-	-	-	-	48	-	-	960	9	14	48
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'91		00%			00%			00%										
'99		04%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'91	0	Dec:	-			
												'99	960		-			
Chrysothamnus viscidiflorus viscidiflorus																		
Y	91	54	34	9	6	-	-	1	-	-	104	-	-	-	6933			104
	99	46	-	-	-	-	-	-	-	-	46	-	-	-	920			46
M	91	24	43	6	5	3	-	-	-	-	81	-	-	-	5400	5	10	81
	99	310	-	-	-	-	-	-	-	-	310	-	-	-	6200	13	21	310
D	91	2	-	-	-	-	-	-	-	-	2	-	-	-	133			2
	99	6	-	-	-	-	-	-	-	-	1	-	1	4	120			6
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'91		43%			08%			00%			-42%							
'99		00%			00%			01%										
Total Plants/Acre (excluding Dead & Seedlings)												'91	12466	Dec:	1%			
												'99	7240		2%			
Cowania mexicana stansburiana																		
M	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0	9	17	0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'91		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'91	0	Dec:	-			
												'99	0		-			

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Mahonia repens																		
Y	91	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
	99	5	-	-	-	-	-	-	-	-	5	-	-	100			5	
M	91	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0	
	99	8	-	-	-	-	-	-	-	-	8	-	-	160	3	6	8	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'91		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)														'91	0	Dec:	-	
														'99	260		-	
Rosa woodsii																		
Y	91	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
	99	4	-	-	-	-	-	-	-	-	4	-	-	80			4	
M	91	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0	
	99	9	-	-	-	-	-	-	-	-	9	-	-	180	9	9	9	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'91		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)														'91	0	Dec:	-	
														'99	260		-	
Symphoricarpos oreophilus																		
Y	91	-	7	-	-	-	-	-	-	-	7	-	-	466			7	
	99	6	-	-	-	-	-	-	-	-	6	-	-	120			6	
M	91	-	-	2	1	-	-	-	-	-	3	-	-	200	6	10	3	
	99	13	-	-	2	-	-	-	-	-	15	-	-	300	19	32	15	
D	91	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
	99	1	-	-	-	-	-	-	-	-	1	-	-	20			1	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'91		70%			20%			00%			-34%							
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)														'91	666	Dec:	0%	
														'99	440		5%	
Tetradymia canescens																		
Y	91	-	1	-	-	-	-	-	-	-	1	-	-	66			1	
	99	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'91		100%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)														'91	66	Dec:	-	
														'99	0			

Trend Study 25A-14-99

Study site name: Row of Pines Exclosure.

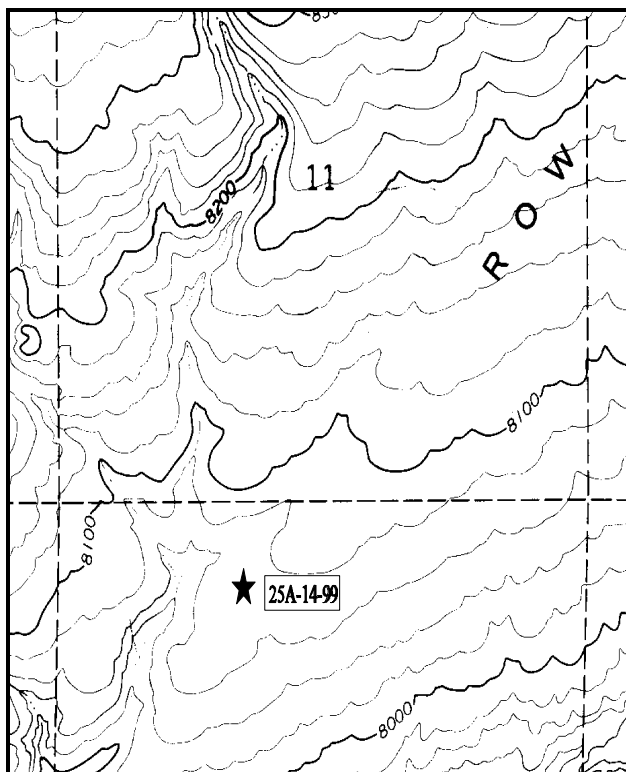
Range type: Big Sagebrush-Grass.

Compass bearing: frequency baseline 165°M.

Footmark (first frame at) 5 feet, footmarks (frequency belts) line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

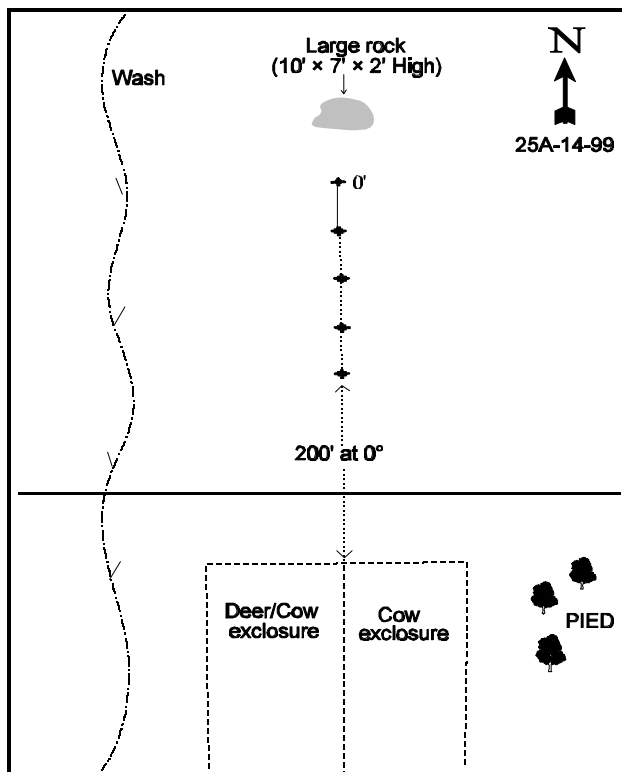
LOCATION DESCRIPTION

From the Chappell Cheese Factory northwest of Loa on SR 24, go west 2.6 miles to a side road on the north where the highway makes a sharp turn (0.95 miles west of mile marker #49). Take this road 0.65 miles and turn right after crossing a cattleguard. After 0.7 more miles, turn right at the fork and cross another cattleguard. Go 2.7 miles to another fork where you will again turn right. After ~60', turn right (east) and go 1.4 miles to an exclosure. Stop at the middle of the exclosure and walk 200 feet at an azimuth of 0°M to the 400' stake. The 0' stake is 400 feet to the north in front of a large rock.



Map Name: Loa, Utah

Township 27S, Range 2E, Section 14



Diagrammatic Sketch

UTM 4258009.860 N, 442706.420 E

DISCUSSION

Trend Study No. 25A-14 (44-8)

The Row of Pines Exclosure was a new study established in 1991. It samples a sagebrush-grass type which was chained and seeded. The site has a slight slope of 3% to 5% with a south aspect. The transect was set up 200 feet north of the Row of Pines exclosure built by the BLM and DWR. The area is within the BLM seven mile allotment which allows cattle grazing for approximately 20 days in May. Cattle sign and tracks were found in the area in 1991. Deer sign and remains were also found in 1991 and pellet group data estimated 21 deer days use/acre (52 ddu/ha). Large amounts of sage grouse droppings were also encountered on the area during study site establishment in 1991. Pellet group data from the site in 1999 estimate 29 deer, 15 elk and 15 cow days use/acre (72 ddu/ha, 37 edu/ha, 37 cdu/ha). All of the elk pellet groups appeared to be from the winter, while about half of the deer pellet groups are from this spring and early summer. All cattle pats appear to be from last season. Escape cover for big game is nonexistent on the site, although some does occur about a one-half mile or so from the transect.

Soil depth is moderately shallow with an estimated effective rooting depth of just over 11 inches. Texture is a sandy clay loam to a loam with a neutral pH (7.0). Soil parent material is basalt. Phosphorus is marginal at 8.5 ppm. Values less than 10 ppm have been shown to limit normal plant growth and development. The soil surface is a combination of pavement and bare ground with some evidence of soil erosion. However, due to the lack of slope, water erosion is not currently a significant problem in this area. Wind erosion however, may be more of a concern.

The dominant browse species is Wyoming big sagebrush which had a density of 6,399 plants/acre in 1991 and 5,580 by 1999. Sagebrush currently ('99) provides 77% of the browse cover. Most of the population is mature or decadent. Seedlings and young are present in low numbers. Utilization has been moderate to heavy since 1991, but vigor is generally good and percent decadence has remained relatively stable at 27% in 1991 and 29% in 1999. However, nearly half (47%) of the decadent plants sampled were classified as dying and there are currently not enough young plants to replace them.

The only other common shrubs are undesirable increasers, narrowleaf low rabbitbrush and broom snakeweed. Narrowleaf low rabbitbrush has declined in density since 1991 primarily due to the much larger sample used in 1999 which gives more accurate density estimates for browse populations with discontinuous distributions. It currently appears stable at 1,100 plants/acre. Broom snakeweed has increased from 6,066 plants/acre in 1991 to 10,000 by 1999. Some of the increase would be due to the much larger sample size, however it has obviously increased considerably. Mature plants have also increased in size from only 2 inches high with a 2 inch crown in 1991 to 7 by 8 inches in 1999. Most of the population is mature where young plants account for 10% of population.

Seeded grasses, crested wheatgrass, smooth brome, and Russian wildrye, have become established since the chaining but in low numbers. The dominant grass is blue grama and bottlebrush squirreltail which currently provide 93% of the grass cover. Forb composition and abundance is poor with all forbs combined providing less than 1% cover in 1999. The only common species encountered in 1999 was low fleabane.

1991 APPARENT TREND ASSESSMENT

With the high amount of pavement and rock, the soil is basically stable. The disturbance due to chaining caused only slight erosion, with much of the erosion likely caused by wind and not water. Forbs on the site are not abundant or diverse. The major forage species is Wyoming big sage which is in good condition.

1999 TREND ASSESSMENT

Trend for soil is stable to improving. Percent cover of bare ground has declined while litter cover has also gone down. Rock and pavement cover have increased. Erosion does not currently appear to be a problem on this site. Trend for browse is down slightly. The key species, Wyoming big sagebrush, has a stable population, however 47% (760 plants/acre) of the decadent plants appear to be dying. The proportion of young plants in the population has declined from 15% in 1991 to only 6% currently. There are not enough young plants to replace decadent/dying individuals. Seedlings are rare. Utilization has remained moderate to heavy. That proportion of the population classified with poor vigor has increased from 2 to 14%. Another negative aspect of the browse trend is the increase in density and size of broom snakeweed. It currently has a mostly mature population of 10,000 plants/acre. Trend for the herbaceous understory is up slightly. Sum of nested frequency of grasses and forbs has increased slightly since 1991. Composition is poor however with the low growing blue grama providing 73% of the grass cover and 68% of the herbaceous cover. Seeded grasses did not establish well and remain at low numbers. Forbs are lacking.

TREND ASSESSMENT

soil - stable to improving

browse - down slightly

herbaceous understory - up slightly

HERBACEOUS TRENDS --

Herd unit 25A, Study no: 14

Type	Species	Nested Frequency		Quadrat Frequency		Average Cover %
		'91	'99	'91	'99	
G	Agropyron cristatum	32	36	15	16	.22
G	Bouteloua gracilis	122	149	50	52	6.48
G	Bromus inermis	4	9	3	4	.07
G	Elymus junceus	1	*19	1	11	.18
G	Oryzopsis hymenoides	33	18	16	8	.11
G	Sitanion hystrix	135	152	64	67	1.73
G	Stipa comata	2	1	1	1	.00
Total for Annual Grasses		0	0	0	0	0
Total for Perennial Grasses		329	384	150	159	8.83
Total for Grasses		329	384	150	159	8.83
F	Androsace septentrionalis (a)	-	12	-	5	.02
F	Arabis demissa	2	-	2	-	-
F	Astragalus lentiginosus	4	6	2	2	.01
F	Descurainia pinnata (a)	-	4	-	2	.01
F	Eriogonum ovalifolium	7	3	4	2	.18
F	Erigeron pumilus	7	*63	5	32	.38
F	Phlox longifolia	12	5	8	3	.01
F	Sphaeralcea coccinea	13	*5	11	5	.02
Total for Annual Forbs		0	16	0	7	0.03

T y p e	Species	Nested Frequency		Quadrat Frequency		Average Cover % 09
		'91	'99	'91	'99	
	Total for Perennial Forbs	45	82	32	44	0.61
	Total for Forbs	45	98	32	51	0.64

* Indicates significant difference at % = 0.10 (annuals excluded)

BROWSE TRENDS --

Herd unit 25A, Study no: 14

T y p e	Species	Strip Frequency 09	Average Cover % 09
B	Artemisia frigida	5	-
B	Artemisia tridentata wyomingensis	93	13.11
B	Chrysothamnus viscidiflorus stenophyllus	31	.45
B	Gutierrezia sarothrae	96	3.20
B	Opuntia fragilis	14	.19
B	Pediocactus simpsonii	1	-
	Total for Browse	240	16.96

BASIC COVER --

Herd unit 25A, Study no: 14

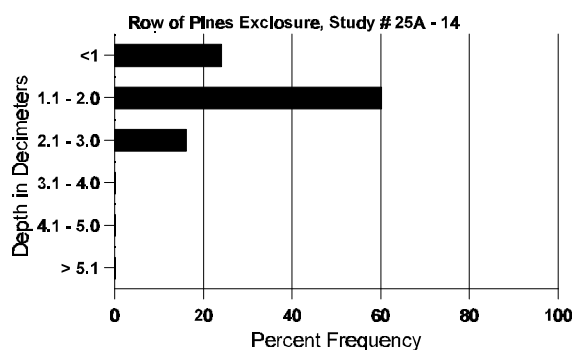
Cover Type	Nested Frequency 09	Average Cover %	
		'91	'99
Vegetation	301	4.00	25.65
Rock	243	11.50	13.64
Pavement	361	23.00	29.28
Litter	350	27.00	18.03
Cryptogams	35	0	.24
Bare Ground	328	34.50	21.60

SOIL ANALYSIS DATA --

Herd Unit 25A, Study # 14, Study Name: Row of Pines Exclosure

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
11.2	55.4 (12.2)	7.0	47.3	27.4	25.3	1.6	8.5	163.2	0.6

Stoniness Index



PELLET GROUP FREQUENCY --

Herd unit 25A, Study no: 14

Type	Quadrat Frequency '99	Pellet Transect Days Use/Acre (ha) '99
Rabbit	34	n/a
Elk	5	15(37)
Deer	16	29(72)
Cattle	3	15(37)

BROWSE CHARACTERISTICS --

Herd unit 25A, Study no: 14

Artemisia frigida																			
A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total	
		1	2	3	4	5	6	7	8	9	1	2	3	4					
Y	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1	
M	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0	
	99	3	2	4	-	-	-	-	-	-	9	-	-	-	180	4	6	9	
% Plants Showing		<u>Moderate Use</u>				<u>Heavy Use</u>				<u>Poor Vigor</u>				<u>%Change</u>					
'91		00%				00%				00%									
'99		20%				40%				00%									
Total Plants/Acre (excluding Dead & Seedlings)														'91	0	Dec:	-		
														'99	200		-		

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Artemisia tridentata wyomingensis																		
S	91	9	-	-	-	-	-	3	-	-	12	-	-	-	800		12	
	99	3	-	-	-	-	-	-	-	-	3	-	-	-	60		3	
Y	91	4	6	1	2	-	1	-	-	-	14	-	-	-	933		14	
	99	9	7	-	-	-	-	1	-	-	17	-	-	-	340		17	
M	91	3	19	23	7	2	1	1	-	-	55	-	-	1	3733	7 9	56	
	99	61	89	29	-	2	-	-	-	-	181	-	-	-	3620	13 24	181	
D	91	4	10	9	2	1	-	-	-	-	25	-	-	1	1733		26	
	99	31	23	17	2	4	1	3	-	-	43	-	-	38	1620		81	
X	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	620		31	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'91		40%			36%			02%			-13%							
'99		45%			17%			14%										
Total Plants/Acre (excluding Dead & Seedlings)												'91	6399	Dec:	27%			
												'99	5580		29%			
Chrysothamnus viscidiflorus stenophyllus																		
S	91	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	91	4	3	-	-	-	1	-	-	-	7	-	-	1	533		8	
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
M	91	5	14	9	-	-	2	-	-	-	30	-	-	-	2000	4 6	30	
	99	36	2	-	3	-	-	-	-	-	41	-	-	-	820	4 9	41	
D	91	3	5	3	-	-	-	-	-	-	11	-	-	-	733		11	
	99	7	2	-	3	-	-	1	-	-	6	2	-	5	260		13	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'91		45%			31%			02%			-66%							
'99		07%			00%			09%										
Total Plants/Acre (excluding Dead & Seedlings)												'91	3266	Dec:	22%			
												'99	1100		24%			
Gutierrezia sarothrae																		
S	91	4	-	-	-	-	-	-	-	-	4	-	-	-	266		4	
	99	26	-	-	-	-	-	-	-	-	26	-	-	-	520		26	
Y	91	20	-	-	2	-	-	2	-	-	24	-	-	-	1600		24	
	99	50	-	-	-	-	-	-	-	-	50	-	-	-	1000		50	
M	91	30	13	10	8	-	-	1	-	-	62	-	-	-	4133	2 2	62	
	99	435	-	-	-	-	-	4	-	-	439	-	-	-	8780	7 8	439	
D	91	5	-	-	-	-	-	-	-	-	4	-	-	1	333		5	
	99	11	-	-	-	-	-	-	-	-	4	-	-	7	220		11	
X	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	500		25	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'91		14%			11%			01%			+39%							
'99		00%			00%			01%										
Total Plants/Acre (excluding Dead & Seedlings)												'91	6066	Dec:	5%			
												'99	10000		2%			

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Opuntia fragilis																		
S	91	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
M	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
	99	19	-	-	4	-	-	1	-	-	24	-	-	-	480	2	24	
D	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	1	-	-	-	-	-	-	-	-	-	-	-	1	20		1	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'91		00%			00%			00%										
'99		00%			00%			04%										
Total Plants/Acre (excluding Dead & Seedlings)												'91	0	Dec:	0%			
												'99	540		4%			
Pediocactus simpsonii																		
Y	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'91		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'91	0	Dec:	-			
												'99	20		-			

Trend Study 25A-16-99

Study site name: Tommy Hollow .

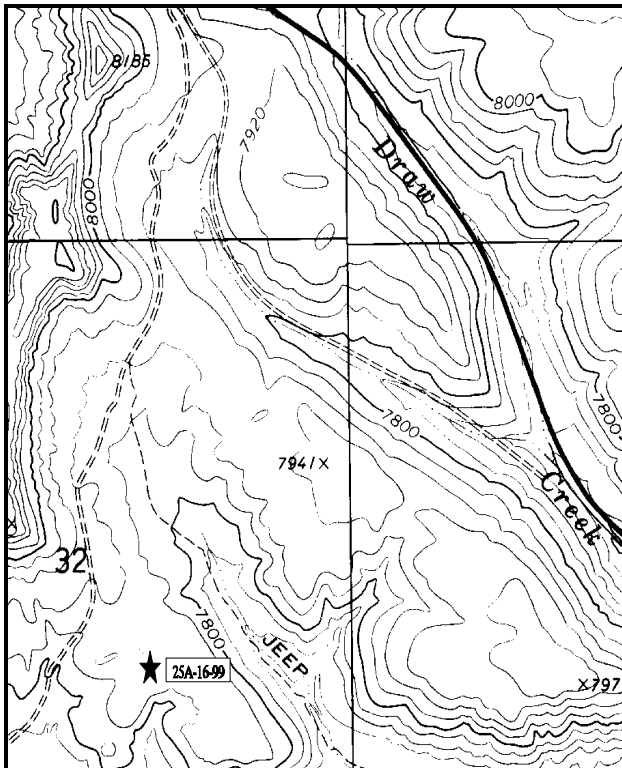
Range type: Big Sagebrush-Grass .

Compass bearing: frequency baseline 167°M.

Footmark (first frame at) 5 feet, footmarks (frequency belts) line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

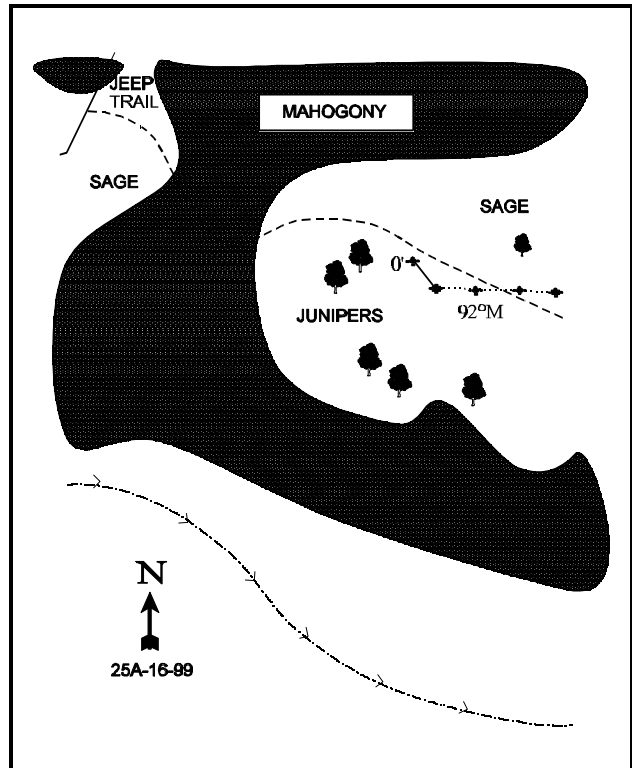
LOCATION DESCRIPTION

Take I-70 east for about 37.5 miles from Salina to a rest area exit. From the exit, turn right once, then right again to go west on the frontage road paralleling the freeway. Drive on the frontage road for 3.75 miles to a road (FS #013) turning left. Take this left turn and proceed 0.1 miles to a "T" in the road, turn left again and go south for 0.75 miles to the crest of the second hill. On the crest there is an old jeep trail turning left and going down the top of the hill. This road goes through a small clearing at the intersection, then through a thick patch of mahogany and junipers. The transect begins in the next sage clearing beyond the trees, about 50 feet past two pinyons standing beside each other near the edge of the clearing. The transect is marked with 2-1/2 foot tall rebar. The 0-foot baseline stake has a red browse tag #7193 attached.



Map Name: Old Woman Plateau, Utah

Township 23S , Range 4E , Section 32



Diagrammatic Sketch

UTM 4290474.897 N, 457845.521 E

DISCUSSION

Trend Study No. 25A-16 (45-2)

This study, Tommy Hollow, is on the low rolling mountains about one mile south of Emigrant Pass on I-70 at about 7,800 feet. It samples a flat that is dominated by sagebrush and grass and surrounded by curlleaf mountain mahogany and pinyon-juniper trees. According to the Forest Service, the Tommy Hollow area is a sheep allotment and grazed in early June and July, but cattle were seen on site in July of 1985. There were no recent signs of deer use, although older pellet groups were common. In 1985, there were also signs to indicate that elk also use the site in winter. Pellet group data in 1991 estimated 42 deer and 15 elk days use/acre (103 ddu/ha, 38 edu/ha). Pellet group data from 1999 estimate 96 deer, 93 elk and 9 cow days use/acre (237 ddu/ha, 229 edu/ha, 22 cdu/ha). Most of the deer and elk pellet groups were from winter use. Rabbit sign was also very common.

The soil is relatively deep with an effective rooting depth estimated at nearly 19 inches. It is a sandy clay loam with a slightly acid pH (6.5). Phosphorus is limiting at only 4.1 ppm. Values less than 10 ppm have been shown to limit normal plant growth and development. There is a hard clay layer in some areas at about 4 to 6 inches in depth. The soil penetrometer was able to penetrate the layer but it must be limiting to root development since black sagebrush is found in these areas. The soil surface has little rock or pavement cover and there is a high amount of bare soil exposed in the shrub interspaces. There is little erosion occurring however due to the lack of significant slope combined with fairly good vegetation and litter cover.

The key species in the flat are Wyoming big sagebrush and black sagebrush which currently ('99) provide 62% of the browse cover. Both have high population densities with good numbers of seedlings and young. Utilization was light to moderate in 1985 and 1999, but heavier in 1991. Percent decadence has been low except for 1991 when 55% of the black sagebrush and 51% of the Wyoming big sagebrush were classified as decadent. Currently, both populations of sagebrush are more healthy, show light to moderate use, low decadence, and contain low numbers of dead plants. Some of the change in density of sagebrush between 1991 and 1999 is due to the much larger sample used in 1999.

Several other desirable browse species available on or near the site include winterfat, bitterbrush, curlleaf mountain mahogany, and Utah serviceberry. Besides providing variety in forage, the nearby curlleaf mountain mahogany and pinyon-juniper stands provide good protective cover. Bitterbrush occur in low numbers but continue to receive moderate to heavy use. The entire population was classified as decadent in 1991, but currently only 33% of the stand is currently ('99) decadent. Stickyleaf low rabbitbrush and broom snakeweed are also abundant. There apparently was some confusion with identification of these two similar looking species in 1985 and 1991. Currently ('99) rabbitbrush numbers 12,580 plants/acre and broom snakeweed 5,780. They are small in stature, mostly unutilized and appear to have stable populations.

The understory vegetation is composed of a variety of grasses and forbs. The frequency of grasses is moderate. Common grasses include mutton bluegrass, bottlebrush squirreltail, blue grama, and western wheatgrass. Forbs are diverse but most species occur only occasionally. The most abundant forb is the low growing pussytoes which currently ('99) provides 60% of the forb cover.

1985 APPARENT TREND ASSESSMENT

Basically, the range trend appears stable to slightly down. There is a minimal amount of erosion which will not be a problem unless the ground is severely disturbed. Species diversity is high and the key species are vigorous and reproducing. Increaser species should be monitored closely as an indication of deteriorating range conditions.

1991 TREND ASSESSMENT

Soil trend would be considered improving since 1985 because there is less bare ground. However, it is still considered in poor condition because percent bare ground is still relatively high at 34%. Key browse species (Wyoming big sagebrush and black sagebrush) have shown some notable changes. The black sagebrush population has decreased by 12%, but it was already over 10,000 plants per acre. Percent decadency has gone from 7% to 55%. This would be expected with the prolonged drought. Wyoming big sagebrush has increased dramatically. Its population has more than doubled, but percent decadency has gone up from 6% to 51%. With increased moisture, this decadency rate would be expected to go downward. Broom snakeweed was picked up in 1991 with an estimated population of 133 plants per acre. Browse trend would be considered slightly down. The principal grass species have been stable since 1985, with the exception of western wheatgrass which has gone from an 8% to 33% quadrat frequency. The forbs are stable with some losses and some gains, depending on their tolerance to drought.

TREND ASSESSMENT

soil - stable to slightly improving, but in poor condition

browse - slightly down

herbaceous understory - stable

1999 TREND ASSESSMENT

Trend for soil is stable to slightly improving, but still poor condition. Percent bare ground has increased but litter cover has also gone down. There is litter erosion occurring on the site due to the high vegetation cover combined with the gentle terrain. Trend for the key species, Wyoming big sagebrush and black sagebrush, is considered up slightly. The populations contain few dead plants indicating that the difference in densities between 1991 and 1999 is mainly due to the much larger sample now used which gives more accurate estimates for browse densities. Both populations show light to moderate use, improved vigor, and declining decadence. Both populations also show good young recruitment. Another positive aspect of the browse trend is the improvement in vigor for bitterbrush. During the 1991 reading, all of the bitterbrush were decadent and showed poor vigor. Now all show normal vigor and only 33% of the plants are considered decadent. Trend for the herbaceous understory is down slightly. Sum of nested frequency of grasses has declined slightly while nested frequency of perennial forbs has declined considerably. Nested frequency of Carex and bottlebrush squirreltail declined significantly while mutton bluegrass increased significantly. The forb composition is diverse but low growing species pussytoes, low fleabane, and desert phlox are the most abundant.

TREND ASSESSMENT

soil - stable to slightly improving

browse - up slightly

herbaceous understory - down slightly

HERBACEOUS TRENDS --
Herd unit 25A, Study no: 16

T y p e	Species	Nested Frequency			Quadrat Frequency			Average Cover % 09
		'85	'91	'99	'85	'91	'99	
G	Agropyron smithii	a19	b84	b109	8	33	43	1.16
G	Bouteloua gracilis	116	117	91	47	48	34	1.48
G	Bromus tectorum (a)	-	-	2	-	-	1	.00
G	Carex spp.	b269	b264	a27	89	89	12	.69
G	Festuca ovina	b11	a-	c62	5	-	26	.84
G	Oryzopsis hymenoides	b72	a8	a4	33	4	2	.01
G	Poa fendleriana	a23	a30	b174	10	14	66	4.87
G	Poa secunda	b9	a-	a2	6	-	1	.00
G	Sitanion hystrix	ab142	b166	a110	58	70	40	2.10
G	Stipa comata	8	5	5	4	3	3	.07
G	Stipa lettermani	a8	a14	b52	3	5	20	1.18
Total for Annual Grasses		0	0	2	0	0	1	0.00
Total for Perennial Grasses		677	688	636	263	266	247	12.42
Total for Grasses		677	688	638	263	266	248	12.43
F	Agoseris glauca	-	5	-	-	2	-	-
F	Allium spp.	1	-	2	1	-	1	.03
F	Antennaria rosea	a14	b74	a27	6	36	9	2.40
F	Androsace septentrionalis (a)	-	-	28	-	-	15	.07
F	Arabis spp.	a-	c91	b13	-	46	6	.03
F	Arabis demissa	c47	b25	a-	25	12	-	-
F	Astragalus convallarius	-	-	1	-	-	1	.03
F	Astragalus spp.	1	1	9	1	1	5	.22
F	Castilleja chromosa	1	1	3	1	1	2	.01
F	Calochortus nuttallii	a23	b50	a5	10	24	2	.01
F	Crepis acuminata	-	2	-	-	1	-	-
F	Cymopterus spp.	-	3	-	-	2	-	-
F	Erigeron eatonii	ab6	a1	b13	3	1	6	.08
F	Erigeron pumilus	c110	b39	a14	49	21	7	.03
F	Eriogonum racemosum	a3	a-	b13	1	-	7	.13
F	Hymenoxys richardsonii	a-	a-	b13	-	-	6	.18
F	Ipomopsis aggregata	-	-	3	-	-	1	.03
F	Machaeranthera canescens	-	1	2	-	1	2	.01
F	Penstemon spp.	a-	a-	b8	-	-	4	.07
F	Penstemon pachyphyllus	3	2	2	1	1	2	.06
F	Phlox austromontana	a2	a-	b21	1	-	10	.22
F	Polygonum douglasii (a)	-	-	9	-	-	4	.02
F	Potentilla gracilis	-	-	3	-	-	1	.00
F	Sphaeralcea coccinea	b83	b60	a34	34	28	14	.34

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover % 09
		'85	'91	'99	'85	'91	'99	
F	Taraxacum officinale	-	-	4	-	-	2	.01
F	Unknown forb-perennial	-	-	2	-	-	1	.00
Total for Annual Forbs		0	0	37	0	0	19	0.09
Total for Perennial Forbs		294	355	192	133	177	89	3.94
Total for Forbs		294	355	229	133	177	108	4.03

Values with different subscript letters are significantly different at $\alpha = 0.10$ (annuals excluded)

BROWSE TRENDS --

Herd unit 25A, Study no: 16

Type	Species	Strip Frequency 09	Average Cover % 09
B	Amelanchier utahensis	4	.38
B	Artemisia nova	69	3.59
B	Artemisia tridentata tridentata	1	.15
B	Artemisia tridentata wyomingensis	85	13.40
B	Ceratoides lanata	5	.00
B	Cercocarpus ledifolius	0	.00
B	Chrysothamnus depressus	5	.03
B	Chrysothamnus viscidiflorus viscidiflorus	84	5.66
B	Echinocereus triglochidatus	-	.00
B	Gutierrezia sarothrae	53	.93
B	Opuntia spp.	15	.26
B	Pinus edulis	2	-
B	Purshia tridentata	8	2.97
B	Symphoricarpos oreophilus	4	.21
B	Tetradymia canescens	3	-
Total for Browse		338	27.61

BASIC COVER --

Herd unit 25A, Study no: 16

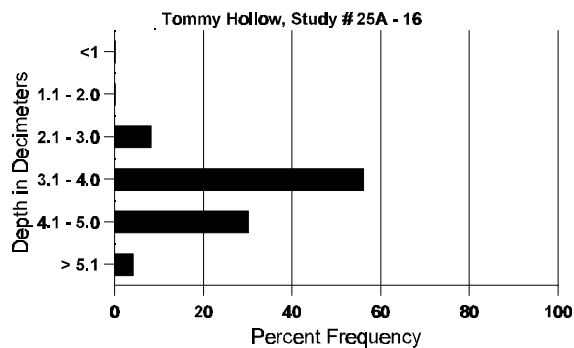
Cover Type	Nested Frequency 09	Average Cover %		
		'85	'91	'99
Vegetation	351	13.50	9.75	45.80
Rock	10	.25	0	.04
Pavement	127	1.50	1.75	.53
Litter	352	43.25	46.00	36.16
Cryptogams	172	0	8.50	6.69
Bare Ground	290	41.50	34.00	27.71

SOIL ANALYSIS DATA --

Herd Unit 25A, Study # 16, Study Name: Tommy Hollow

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
18.8	51.8 (18.1)	6.5	52.9	15.8	31.3	1.6	4.1	163.2	0.6

Stoniness Index



PELLET GROUP FREQUENCY --

Herd unit 25A, Study no: 16

Type	Quadrat Frequency 09	Pellet Transect Days Use/Acre (ha) 09
Rabbit	67	n/a
Elk	32	93(230)
Deer	15	96(237)
Cattle	3	9(22)

BROWSE CHARACTERISTICS --

Herd unit 25A, Study no: 16

A G R E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Amelanchier utahensis																		
Y	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	-	1	-	-	-	-	-	-	-	1	-	-	-	66		1	
	99	1	1	-	-	-	-	-	-	-	2	-	-	-	40		2	
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
	99	-	-	2	-	1	-	-	-	-	3	-	-	-	60	38	29	
D	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	-	-	-	1	-	-	-	-	-	1	-	-	-	66		1	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		00%			00%			00%										
'91		50%			00%			00%			-24%							
'99		40%			40%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	0	Dec:	0%			
												'91	132		50%			
												'99	100		0%			
Artemisia nova																		
S	85	12	-	-	-	-	-	-	-	-	12	-	-	-	800		12	
	91	8	-	-	1	-	-	-	-	-	9	-	-	-	600		9	
	99	7	-	-	-	-	-	-	-	-	7	-	-	-	140		7	
Y	85	73	1	-	-	-	-	-	-	-	74	-	-	-	4933		74	
	91	19	9	7	1	-	-	-	-	-	34	2	-	-	2400		36	
	99	84	10	-	-	-	-	-	-	-	94	-	-	-	1880		94	
M	85	71	5	2	-	-	-	-	-	-	77	-	1	-	5200	8	11	
	91	-	12	13	1	2	-	1	-	-	29	-	-	-	1933	7	10	
	99	205	55	-	-	-	-	-	-	-	260	-	-	-	5200	9	16	
D	85	8	1	2	-	-	-	-	-	-	11	-	-	-	733		11	
	91	15	28	30	-	2	1	-	-	2	60	-	-	18	5200		78	
	99	34	1	1	-	-	-	-	-	-	20	-	-	16	720		36	
X	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	320		16	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		04%			02%			.61%			-12%							
'91		37%			37%			13%			-18%							
'99		17%			.25%			04%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	10866	Dec:	7%			
												'91	9533		55%			
												'99	7800		9%			

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Artemisia tridentata tridentata																		
Y	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	-	1	-	-	-	-	-	-	-	-	1	-	-	66		1	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
D	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	-	-	1	-	-	-	-	-	-	-	1	-	-	66		1	
	99	-	-	-	-	-	-	-	-	1	-	1	-	-	20		1	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		00%			00%			00%										
'91		50%			50%			00%			-85%							
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	0	Dec:	0%			
												'91	132		50%			
												'99	20		100%			
Artemisia tridentata wyomingensis																		
S	85	37	-	-	-	-	-	-	-	-	37	-	-	-	2466		37	
	91	117	-	1	5	-	-	4	-	-	127	-	-	-	8466		127	
	99	13	-	-	-	-	-	-	-	-	13	-	-	-	260		13	
Y	85	57	-	-	-	-	-	-	-	-	55	2	-	-	3800		57	
	91	30	37	14	5	1	2	-	-	-	89	-	-	-	5933		89	
	99	86	13	-	-	-	-	-	-	-	99	-	-	-	1980		99	
M	85	42	9	1	-	-	-	-	-	-	50	1	1	-	3466	11 11	52	
	91	8	7	15	2	-	-	-	-	-	32	-	-	-	2133	11 18	32	
	99	111	63	-	-	-	-	-	-	-	174	-	-	-	3480	21 32	174	
D	85	3	3	1	-	-	-	-	-	-	6	1	-	-	466		7	
	91	31	45	47	-	-	4	-	-	-	83	-	-	44	8466		127	
	99	39	30	1	1	-	-	-	-	-	62	-	-	9	1420		71	
X	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	240		12	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		10%			02%			.86%			+53%							
'91		36%			33%			18%			-58%							
'99		31%			.29%			03%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	7732	Dec:	6%			
												'91	16532		51%			
												'99	6880		21%			

A G R E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Ceratoides lanata																		
S	85	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	91	2	-	-	-	-	-	-	-	-	2	-	-	-	133		2	
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
Y	85	6	-	-	-	-	-	-	-	-	6	-	-	-	400		6	
	91	-	1	2	-	-	1	-	-	-	4	-	-	-	266		4	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	85	32	-	-	-	-	-	-	-	-	32	-	-	-	2133	4	3	
	91	-	-	41	-	-	1	2	-	-	44	-	-	-	2933	1	2	
	99	-	-	5	-	3	2	-	-	-	10	-	-	-	200	3	3	
D	85	3	-	-	-	-	-	-	-	-	3	-	-	-	200		3	
	91	-	-	2	-	-	-	-	-	-	1	-	-	1	133		2	
	99	-	-	-	-	-	1	-	-	-	1	-	-	-	20		1	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		00%			00%			00%			+18%							
'91		02%			94%			02%			-93%							
'99		27%			73%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	2733	Dec:	7%			
												'91	3332		4%			
												'99	220		9%			
Cercocarpus ledifolius																		
S	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		00%			00%			00%										
'91		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	0	Dec:	-			
												'91	0		-			
												'99	0		-			
Chrysothamnus depressus																		
Y	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	-	1	-	-	-	-	-	-	-	1	-	-	-	66		1	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	91	-	1	5	-	-	4	-	-	-	10	-	-	-	666	2	2	
	99	-	3	2	3	-	1	-	-	-	9	-	-	-	180	3	5	
D	85	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	91	-	-	-	-	-	1	-	-	-	1	-	-	-	66		1	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		00%			00%			00%			+92%							
'91		17%			83%			00%			-77%							
'99		33%			33%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	66	Dec:	100%			
												'91	798		8%			
												'99	180		0%			

A G R E	Y	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Chrysothamnus viscidiflorus viscidiflorus																		
S	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	8	-	-	-	-	-	-	-	-	8	-	-	-	533		8	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	65	13	14	7	1	1	-	-	-	100	1	-	-	6733		101	
	99	19	-	-	1	-	-	-	-	-	20	-	-	-	400		20	
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	91	67	94	61	20	13	2	3	-	-	259	1	-	-	17333	5	5	
	99	597	2	-	-	-	-	-	-	-	599	-	-	-	11980	4	9	
D	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	2	1	6	-	-	1	-	-	-	6	-	-	4	666		10	
	99	10	-	-	-	-	-	-	-	-	10	-	-	-	200		10	
X	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	40		2	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		00%			00%			00%										
'91		33%			23%			01%			-49%							
'99		.31%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	0	Dec:	0%			
												'91	24732		3%			
												'99	12580		2%			
Gutierrezia sarothrae																		
S	85	18	-	-	-	-	-	-	-	-	18	-	-	-	1200		18	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
Y	85	47	-	-	-	-	-	-	-	-	47	-	-	-	3133		47	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	41	-	-	-	-	-	-	-	-	41	-	-	-	820		41	
M	85	222	-	-	-	-	-	-	-	-	222	-	-	-	14800	5	7	
	91	2	-	-	-	-	-	-	-	-	2	-	-	-	133	4	5	
	99	248	-	-	-	-	-	-	-	-	248	-	-	-	4960	6	7	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		00%			00%			00%			-99%							
'91		00%			00%			00%			+98%							
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	17933	Dec:	-			
												'91	133		-			
												'99	5780		-			

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Opuntia spp.																		
S	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	1	-	-	-	-	-	-	-	-	-	-	-	-	66		1	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	3	-	-	1	-	-	-	-	-	-	-	-	-	266		4	
	99	8	-	-	-	-	-	-	-	-	-	-	-	-	160		8	
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
	91	-	-	-	-	-	-	2	-	-	-	-	-	-	133	2	2	
	99	19	-	-	-	-	-	-	-	-	-	-	-	-	380	3	19	
D	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	2	-	-	-	-	-	-	-	-	-	-	-	2	40		2	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		00%			00%			00%										
'91		00%			00%			00%			+31%							
'99		00%			00%			07%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	0	Dec:	0%			
												'91	399		0%			
												'99	580		7%			
Pinus edulis																		
S	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
Y	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		00%			00%			00%										
'91		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	0	Dec:	-			
												'91	0		-			
												'99	40		-			

A G R E	Y	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Purshia tridentata																		
Y	85	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	-	2	-	-	-	-	-	2	-	-	-	40		2	
M	85	-	1	1	-	-	-	-	-	-	2	-	-	-	133	20	23	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	99	-	1	1	1	-	1	-	-	-	4	-	-	-	80	20	48	
D	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	-	-	-	-	-	-	1	-	3	-	-	-	4	266		4	
	99	-	2	1	-	-	-	-	-	-	3	-	-	-	60		3	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		33%			33%			00%			+25%							
'91		00%			75%			100%			-32%							
'99		33%			33%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	199	Dec:	0%			
												'91	266		100%			
												'99	180		33%			
Symphoricarpos oreophilus																		
Y	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	99	4	-	-	-	-	-	-	-	-	4	-	-	-	80	14	27	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		00%			00%			00%										
'91		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	0	Dec:	-			
												'91	0		-			
												'99	120		-			
Tetradymia canescens																		
Y	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	99	-	-	-	-	-	1	-	-	-	1	-	-	-	20	12	15	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		00%			00%			00%										
'91		00%			00%			00%										
'99		00%			33%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	0	Dec:	-			
												'91	0		-			
												'99	60		-			

Trend Study 25A-18-99

Study site name: Elk Camp .

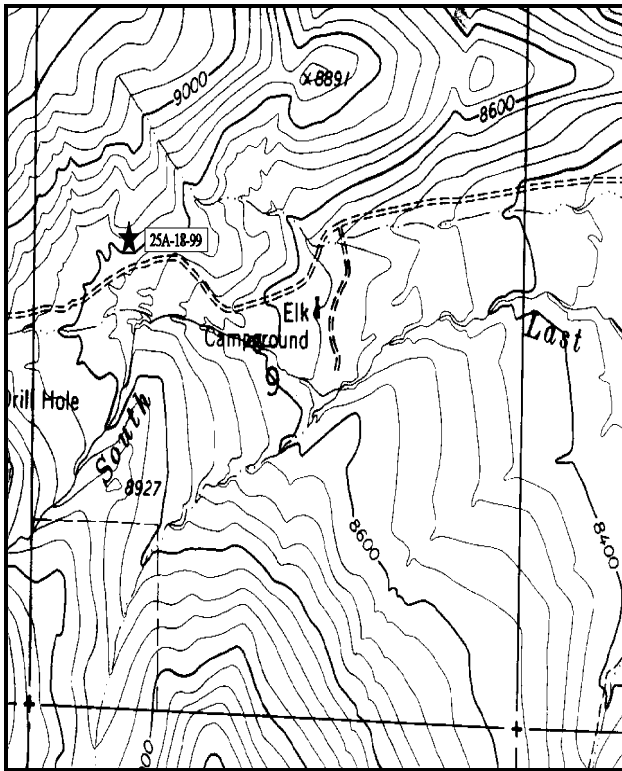
Range type: Mixed Mountain Brush .

Compass bearing: frequency baseline Line 1-170°M, Lines 2-4-352°M.

Footmark (first frame at) 5 feet, footmarks (frequency belts) line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

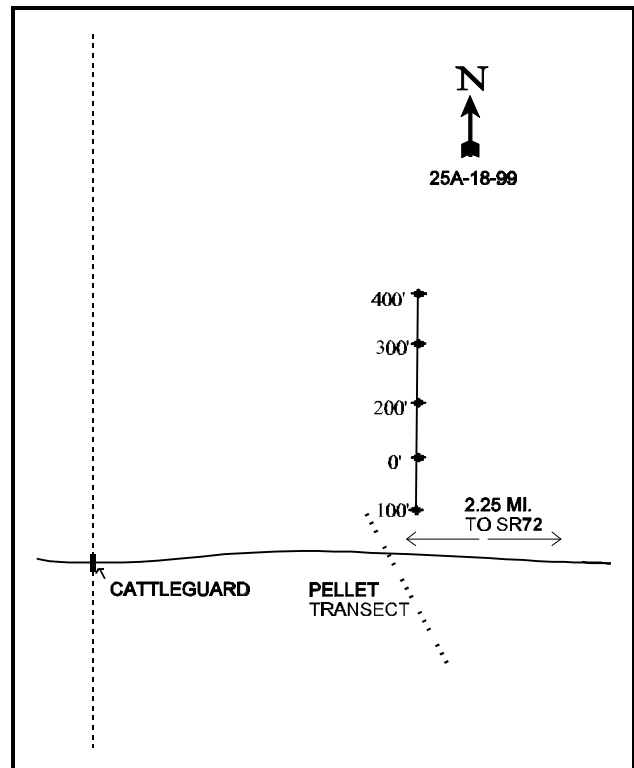
LOCATION DESCRIPTION

Go east from Salina on I-70 for approximately 37.5 miles to the rest area. From the exit, go 2.4 miles east on the frontage road to the junction with SR72. Travel south on SR 72 for 10.15 miles to a gravel road to the right with a sign for Last Chance Road. Turn and go 2 miles to the Elk Camp Road, and continue straight for another 0.2 miles. Stop here, approximately 90 yards short of a cattleguard, and look for a small yellow stake 10 feet off the south side of the road. The yellow pellet group transect stakes run northwest, with one stake every 30 feet. Follow the yellow stakes 90 feet up from the road to a large rebar which marks the 100-foot end of the frequency baseline. The 0-foot baseline stake is 100 feet north and is tagged #7040.



Map Name: John's Peak, Utah

Township 25S , Range 4E , Section 9



Diagrammatic Sketch

UTM 4278136.872 N, 458329.702 E

DISCUSSION

Trend Study No. 25A-18 (45-4)

The Elk Camp trend study is located alongside a Division pellet group transect on the south side of a hill overlooking Elk Camp and south Last Chance Creek. The hill has a slope of about 35% near the base, but it levels out to 12-15% further up the baseline. Elevation is approximately 8,800 feet. The surrounding gentle hills are covered by open sagebrush, grass slopes, scattered pinyons and junipers, and patches of aspen. The range type of the trend study site can be described as a mixed mountain brush, dominated by black sagebrush and antelope bitterbrush.

Pellet group counts demonstrate that deer use varies greatly from year to year (Jense et al. 1985, 1991). The site is above the normal limits of deer winter range as described by Huff and Blotter (1964), but is good range for mild winters and as a transitional range during the spring and fall. Elk use is low but it has increased steadily since 1980 (Jense et al. 1985, 1991). Pellet group data taken along the study site baseline in 1999 estimate 53 deer, 21 elk and 11 cow days use/acre (130 ddu/ha, 52 edu/ha, 27 cdu/ha). All of the cattle pats were from last season. Most of the deer and elk pellet groups were from winter use, but some were more recent. A dead fawn was also found near the site which appears to have died recently. In the past, the area was grazed by sheep, but in 1978 the permits were converted to cattle and it became a part of the Last Chance Cattle Allotment (Fish Lake National Forest). However, sheep were noted on a hillside nearby the transect in July of 1985. The area is within the Lower Last Chance pasture of the Last Chance allotment. Grazing occurs for 25 days on odd years, then the area is rested on even years. Grazing use is light on the slope, but heavier in the valley below along the riparian corridor.

Soil on the site is moderately shallow due to the rocky nature of the site. Effective rooting depth was estimated at only 11 inches. Soil texture is a loam with a slightly acid pH (6.5). There are many large rocks on the surface and throughout the soil. These rocks are of volcanic origin, as is the soil. Infiltration of water is good, but minor sheet erosion has removed some of the top soil leaving an erosion pavement. Pedestaling and terracing is evident on the steeper slopes but erosion is minimal due to the high protective ground cover.

There are several species of shrubs present on the site. The key browse species, black sagebrush, mountain big sagebrush, and bitterbrush, currently make up 66% of the browse cover. The black sagebrush appeared to be declining in 1985 and 1991. Over 50% of the population was decadent in 1985 and many plants had poor vigor. In 1991, percent decadency increased to 70%. The plants had been lightly to moderately utilized. In 1999 the study baseline was lengthened from 100 feet to 400 feet in order to get a better sample. This much larger sample is more effective at estimating shrub densities which often have aggregated and/or discontinuous distributions. Density of black sagebrush with the new sample is 3,560 plants/acre. Utilization continues to be light to moderate but vigor has improved and percent decadency has declined from 70% to 21%. The change in density is due primarily to the larger sample since there were only 160 dead plants sampled. The population of black sagebrush appears to be stable now with adequate recruitment to maintain the current population.

The mountain big sagebrush population has increased with each reading. It occurs in larger numbers further up the slope where it levels out and the soil is deeper. There is a good percentage of seedlings and young in the population and mature sagebrush are producing seed. Use of the mountain big sagebrush has been moderate since 1985 but vigor has been good and percent decadence moderate to low, ranging from 31% in 1991 to only 15% in 1999. Dead plants were common in 1999 due in part to a spotty prescribed burn which effected one of the frequency/density belts. Many of the dead sagebrush were actually burned stems.

The most preferred browse on the site is bitterbrush which has a low spreading growth form on this site. The stand has been heavily hedged since 1985 and the population has steadily declined in density from 5,599 plants/acre in 1985 to 2,560 by 1999. During the 1999 reading, many bitterbrush plants had been browsed to

the point where they have become partly unavailable and some mature plants were classified as unavailable due to heavy use. None of the bitterbrush were producing seed on the site in 1999, but some seedlings and young were encountered. Percent decadence was extremely high in 1991 at 90%, although currently ('99) only 5% of the population is decadent. The population appears to be stable for the moment but continued heavy use could eventually cause problems if coupled with drought.

There is a variety of other browse on the site which add change to the diet and diversity to the community is considered important. The snowberry, gray horsebrush, rubber rabbitbrush, and stickyleaf low rabbitbrush show signs of light hedging.

The site supports a variety of grasses and forbs. The most abundant grasses include muttongrass, sedge, and blue grama. These three species currently ('99) provide 87% of the grass cover. Utilization of the grasses is light with excellent seed production. Forbs are diverse but not very abundant. The more frequently encountered species are low growing and offer little forage.

1985 APPARENT TREND ASSESSMENT

The range appears healthy and well-balanced. The vegetative trend would have to be considered stable. The age class composition information alone would indicate a declining population for black sagebrush. However, over the area as a whole, it appears well-established with adequate regeneration. The bitterbrush population is quite healthy, although heavily hedged. The plant composition is unlikely to change over the next five years, as the diversity should help protect it from any sudden changes. The soil trend is also stable, although it sustains a small amount of top soil loss because of the slope and rockiness of the site.

1991 TREND ASSESSMENT

The soil trend is down because of the increase in percent bare ground which has increased from 9 to 21% and the loss of litter from 61% down to 44%. These data would indicate the propensity for accelerated soil loss to high intensity summer storms. Overall, there are three key browse species, black sagebrush, mountain big sagebrush, and bitterbrush. Black sagebrush decreased in density by 6% (8,532 down to 7,999) and decadency went from 56% to 70%. Mountain big sagebrush was the only one that had increased densities. It increased by 52%. Bitterbrush had it's densities decrease by 31%. Decadency for bitterbrush went from 1% to 90%. The two with the highest densities in effect had the highest losses to their respective populations. Therefore, the trend for browse would be downward. For the herbaceous understory, the grasses as a group slightly increased, while the forbs as a group, were stable. The forbs that did increase were small and insignificant as a forage for wildlife.

TREND ASSESSMENT

soil - slightly down

browse - down

herbaceous understory - stable

1999 TREND ASSESSMENT

Trend for soil is stable to slightly improving. Percent cover of bare ground has declined from 21% to 14% and litter cover declined from 44% to 34%. Erosion is minimal. Trend for browse is up. Density of black sagebrush declined 55% since 1991 but most of the change is due to the larger sample taken in 1999. Use remains moderate to heavy but vigor has improved and percent decadence has declined from 70% to 21%. Mountain big sagebrush has increased in density. It too shows moderate use but displays good vigor and low decadence. The preferred bitterbrush continues to be heavily browsed. Vigor has improved and percent decadence has declined from 90% in 1991 to only 5% now. The population currently appears stable but no

plants were producing seed in 1999 due to the heavy use and drought. Trend for the herbaceous understory is stable with similar sum of nested frequency values for grasses and forbs compared to 1991.

TREND ASSESSMENT

soil - stable to slightly improving

browse - up

herbaceous understory - stable

HERBACEOUS TRENDS --

Herd unit 25A, Study no: 18

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover % '99
		'85	'91	'99	'85	'91	'99	
G	Agropyron smithii	a-	b13	b18	-	5	7	.11
G	Bouteloua gracilis	73	76	96	32	32	35	3.65
G	Carex spp.	112	88	106	48	39	40	3.25
G	Festuca ovina	2	4	9	2	2	4	.09
G	Poa fendleriana	192	186	194	69	75	68	3.56
G	Sitanion hystrix	b83	b109	a47	37	49	20	.42
G	Stipa lettermani	20	46	46	10	17	19	.90
Total for Annual Grasses		0	0	0	0	0	0	0
Total for Perennial Grasses		482	522	516	198	219	193	12.00
Total for Grasses		482	522	516	198	219	193	12.00
F	Agoseris glauca	a-	b14	a-	-	6	-	-
F	Allium spp.	-	2	7	-	1	2	.03
F	Antennaria rosea	b23	a9	b36	14	5	15	.83
F	Androsace septentrionalis (a)	-	-	5	-	-	2	.01
F	Arabis demissa	12	8	7	6	4	3	.18
F	Artemisia ludoviciana	-	3	-	-	1	-	-
F	Astragalus spp.	a-	a-	b22	-	-	9	.14
F	Castilleja chromosa	b13	b13	a-	7	6	-	-
F	Chaenactis douglasii	2	-	-	1	-	-	-
F	Cirsium spp.	-	-	4	-	-	2	.18
F	Comandra pallida	a-	a-	b5	-	-	3	.06
F	Collinsia parviflora (a)	-	-	9	-	-	4	.02
F	Cryptantha spp.	-	2	-	-	1	-	-
F	Erigeron pumilus	a-	a-	b6	-	-	3	.18
F	Eriogonum racemosum	25	34	24	15	18	14	.27
F	Eriogonum umbellatum	16	11	4	8	5	2	.01
F	Hymenoxys richardsonii	c18	b7	a-	10	3	-	-
F	Lithospermum incisum	-	3	-	-	2	-	-

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover % 09
		'85	'91	'99	'85	'91	'99	
F	<i>Machaeranthera canescens</i>	11	3	12	5	1	6	.05
F	<i>Penstemon</i> spp.	a ⁻	ab ²	b ¹⁰	-	2	5	.05
F	<i>Phlox austromontana</i>	a ⁻	a ⁻	b ³²	-	-	11	.35
F	<i>Phlox longifolia</i>	b ¹⁹	c ⁴⁸	a ⁴	14	22	2	.01
F	<i>Polygonum douglasii</i> (a)	-	-	1	-	-	1	.00
F	<i>Senecio multilobatus</i>	ab ²	a ⁻	b ⁷	2	-	4	.04
F	<i>Sphaeralcea coccinea</i>	6	3	3	2	1	1	.00
F	Unknown forb-perennial	b ¹⁴	a ⁻	a ⁻	6	-	-	-
F	<i>Zigadenus paniculatus</i>	3	-	-	1	-	-	-
Total for Annual Forbs		0	0	15	0	0	7	0.03
Total for Perennial Forbs		164	162	183	91	78	82	2.42
Total for Forbs		164	162	198	91	78	89	2.46

Values with different subscript letters are significantly different at % = 0.10 (annuals excluded)

BROWSE TRENDS --

Herd unit 25A, Study no: 18

Type	Species	Strip Frequency 09	Average Cover % 09
B	<i>Artemisia frigida</i>	4	-
B	<i>Artemisia nova</i>	52	5.33
B	<i>Artemisia tridentata</i> vaseyana	58	7.46
B	<i>Chrysothamnus nauseosus</i> albicaulis	1	-
B	<i>Chrysothamnus nauseosus</i> hololeucus	6	.48
B	<i>Chrysothamnus viscidiflorus</i> viscidiflorus	69	3.28
B	<i>Echinocereus triglochidatus</i>	2	.00
B	<i>Eriogonum microthecum</i>	0	-
B	<i>Gutierrezia sarothrae</i>	12	.70
B	<i>Juniperus scopulorum</i>	0	-
B	<i>Mahonia repens</i>	7	.04
B	<i>Opuntia</i> spp.	0	-
B	<i>Pinus edulis</i>	3	2.51
B	<i>Purshia tridentata</i>	49	6.53
B	<i>Rosa woodsii</i>	17	1.89
B	<i>Symphoricarpos oreophilus</i>	23	.75
B	<i>Tetradymia canescens</i>	11	.06
Total for Browse		314	29.08

CANOPY COVER --

Herd unit 25A, Study no: 18

Species	Percent Cover 09
Pinus edulis	4

BASIC COVER --

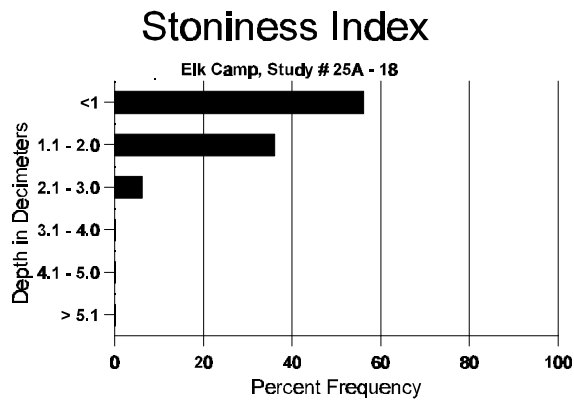
Herd unit 25A, Study no: 18

Cover Type	Nested Frequency 09	Average Cover %		
		'85	'91	'99
Vegetation	339	5.50	13.00	42.04
Rock	223	17.25	21.50	15.66
Pavement	189	7.00	.75	2.48
Litter	348	60.75	44.25	33.96
Cryptogams	5	.25	0	.06
Bare Ground	224	9.25	20.50	14.08

SOIL ANALYSIS DATA --

Herd Unit 25A, Study # 18, Study Name: Elk Camp

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
11.0	55.4 (11.6)	6.5	50.9	29.8	19.3	3.0	16.8	211.2	0.5



PELLET GROUP FREQUENCY --

Herd unit 25A, Study no: 18

Type	Quadrat Frequency 09	Pellet Transect Days Use/Acre (ha) 09
Rabbit	23	n/a
Elk	18	21(52)
Deer	27	53(131)
Cattle	4	11(27)

BROWSE CHARACTERISTICS --

Herd unit 25A, Study no: 18

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Artemisia frigida																		
Y	85	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
M	85	9	-	-	-	-	-	-	-	-	9	-	-	-	600	3	2	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	99	2	2	-	-	-	-	-	-	-	4	-	-	-	80	3	8	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		00%			00%			00%										
'91		00%			00%			00%										
'99		33%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	666	Dec:	-			
												'91	0		-			
												'99	120		-			
Artemisia nova																		
S	85	3	-	-	-	-	-	-	-	-	3	-	-	-	200		3	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	2	-	-	1	-	-	-	-	-	2	-	1	-	60		3	
Y	85	11	5	-	-	-	-	-	-	-	14	-	1	1	1066		16	
	91	4	3	-	-	-	-	-	-	-	7	-	-	-	466		7	
	99	6	12	-	-	-	-	-	-	-	18	-	-	-	360		18	
M	85	19	21	-	-	-	-	-	-	-	39	-	1	-	2666	10	16	
	91	8	13	5	3	-	-	-	-	-	29	-	-	-	1933	11	16	
	99	71	42	9	1	-	-	-	-	-	123	-	-	-	2460	10	20	
D	85	34	34	4	-	-	-	-	-	-	61	-	8	3	4800		72	
	91	8	26	41	-	2	1	-	-	6	67	2	7	8	5600		84	
	99	25	9	2	-	-	1	-	-	-	33	-	-	4	740		37	
X	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	160		8	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		47%			03%			11%			- 6%							
'91		37%			44%			13%			-55%							
'99		35%			07%			02%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	8532	Dec:	56%			
												'91	7999		70%			
												'99	3560		21%			

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Artemisia tridentata vaseyana																		
S	85	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	91	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	99	6	-	-	2	-	-	1	-	-	9	-	-	-	180		9	
Y	85	5	-	-	-	-	-	-	-	-	5	-	-	-	333		5	
	91	4	5	-	-	-	-	1	-	-	9	-	1	-	666		10	
	99	29	2	-	-	-	-	1	-	-	32	-	-	-	640		32	
M	85	-	6	-	-	-	-	-	-	-	6	-	-	-	400	18 20	6	
	91	2	5	-	3	-	-	-	-	-	9	1	-	-	666	22 23	10	
	99	32	46	3	3	-	-	-	-	-	83	1	-	-	1680	27 37	84	
D	85	1	2	-	-	-	-	-	-	-	2	-	1	-	200		3	
	91	2	5	2	-	-	-	-	-	-	5	-	-	4	600		9	
	99	6	11	1	-	1	-	2	-	-	12	-	-	9	420		21	
X	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	880		44	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		57%			00%			07%			+52%							
'91		52%			07%			17%			+29%							
'99		44%			03%			07%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	933	Dec:	21%			
												'91	1932		31%			
												'99	2740		15%			
Chrysothamnus nauseosus albicaulis																		
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	- -	0	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	- -	0	
	99	2	-	-	-	-	-	-	-	-	2	-	-	-	40	- -	2	
D	85	-	-	1	-	-	-	-	-	-	1	-	-	-	66		1	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		00%			100%			00%										
'91		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	66	Dec:	100%			
												'91	0		0%			
												'99	40		0%			

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Chrysothamnus nauseosus hololeucus																		
Y	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
	99	7	1	3	-	-	-	-	-	-	11	-	-	-	220	9	13	
X	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		00%			00%			00%										
'91		00%			00%			00%										
'99		08%			25%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	0	Dec:	-			
												'91	0		-			
												'99	240		-			
Chrysothamnus viscidiflorus viscidiflorus																		
S	85	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	85	28	-	-	-	-	-	-	-	-	28	-	-	-	1866		28	
	91	32	6	-	2	1	-	-	-	-	40	1	-	-	2733		41	
	99	25	-	-	-	-	-	-	-	-	25	-	-	-	500		25	
M	85	92	-	-	-	-	-	-	-	-	92	-	-	-	6133	5	10	
	91	39	41	34	1	1	-	-	-	-	116	-	-	-	7733	3	7	
	99	159	11	3	-	-	-	-	-	-	173	-	-	-	3460	6	12	
D	85	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	91	3	2	-	-	-	1	-	-	-	5	-	-	1	400		6	
	99	5	-	-	-	-	-	-	-	-	3	-	-	2	100		5	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		00%			00%			00%			+26%							
'91		31%			21%			.61%			-63%							
'99		05%			01%			.98%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	8065	Dec:	1%			
												'91	10866		4%			
												'99	4060		2%			
Echinocereus triglochidatus																		
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
	99	2	-	-	-	-	-	-	-	-	2	-	-	-	40	3	2	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		00%			00%			00%										
'91		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	0	Dec:	-			
												'91	0		-			
												'99	40		-			

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Eriogonum microthecum																		
M	85	2	-	-	-	-	-	-	-	-	2	-	-	-	133	1	4	2
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		00%			00%			00%										
'91		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	133	Dec:	-			
												'91	0		-			
												'99	0		-			
Gutierrezia sarothrae																		
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	99	29	-	-	-	-	-	-	-	-	29	-	-	-	580	5	7	29
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		00%			00%			00%										
'91		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	0	Dec:	-			
												'91	0		-			
												'99	580		-			
Juniperus scopulorum																		
Y	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	85	1	-	-	-	-	-	-	-	-	1	-	-	-	66	46	41	1
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		00%			00%			00%			+ 0%							
'91		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	66	Dec:	-			
												'91	66		-			
												'99	0		-			

A G R E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Mahonia repens																		
Y	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	5	-	-	2	-	-	-	-	-	7	-	-	-	140		7	
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
	99	25	-	-	7	-	-	-	-	-	32	-	-	-	640	2	32	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		00%			00%			00%										
'91		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	0	Dec:	-			
												'91	0		-			
												'99	780		-			
Opuntia spp.																		
Y	85	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	91	-	-	-	-	-	-	1	-	-	1	-	-	-	66		1	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	85	8	-	-	-	-	-	-	-	-	8	-	-	-	533	2	8	
	91	2	-	-	1	-	-	1	-	-	4	-	-	-	266	2	4	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0	2	0	
D	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		00%			00%			00%			-34%							
'91		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	599	Dec:	0%			
												'91	398		17%			
												'99	0		0%			
Pinus edulis																		
Y	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
	99	2	-	-	-	-	-	-	-	-	2	-	-	-	40	-	2	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		00%			00%			00%										
'91		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	0	Dec:	-			
												'91	0		-			
												'99	60		-			

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Purshia tridentata																		
S	85	5	-	-	-	-	-	-	-	-	5	-	-	-	333		5	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
Y	85	15	9	11	-	-	-	-	-	-	33	2	-	-	2333		35	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	4	4	1	-	7	2	-	-	-	18	-	-	-	360		18	
M	85	5	16	27	-	-	-	-	-	-	48	-	-	-	3200	13 21	48	
	91	-	-	3	-	-	3	-	-	-	6	-	-	-	400	6 16	6	
	99	2	13	14	-	17	49	2	-	6	103	-	-	-	2060	13 29	103	
D	85	-	-	1	-	-	-	-	-	-	1	-	-	-	66		1	
	91	-	1	38	-	-	7	1	-	5	29	-	-	23	3466		52	
	99	2	-	-	-	-	1	4	-	-	3	-	-	4	140		7	
X	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		30%			46%			00%			-31%							
'91		02%			97%			40%			-34%							
'99		32%			57%			03%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	5599	Dec:	1%			
												'91	3866		90%			
												'99	2560		5%			
Rosa woodsii																		
S	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	3	-	-	-	-	-	-	-	-	3	-	-	-	60		3	
Y	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	31	-	-	-	-	-	-	-	-	31	-	-	-	620		31	
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	- -	0	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	- -	0	
	99	43	-	-	-	-	-	-	-	-	43	-	-	-	860	12 14	43	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		00%			00%			00%										
'91		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	0	Dec:	-			
												'91	0		-			
												'99	1480		-			

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Symphoricarpos oreophilus																		
S	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
Y	85	4	-	-	-	-	-	-	-	-	4	-	-	-	266		4	
	91	-	-	-	1	-	-	1	-	-	2	-	-	-	133		2	
	99	2	2	1	-	-	-	-	-	-	5	-	-	-	100		5	
M	85	4	5	-	-	-	-	-	-	-	9	-	-	-	600	18	16	
	91	1	-	9	3	2	-	1	-	-	16	-	-	-	1066	19	16	
	99	7	8	4	3	1	-	-	-	-	23	-	-	-	460	18	30	
D	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	-	-	-	-	-	1	-	-	-	1	-	-	-	66		1	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		38%			00%			00%			+32%							
'91		11%			53%			00%			-56%							
'99		39%			18%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	866	Dec:	0%			
												'91	1265		5%			
												'99	560		0%			
Tetradymia canescens																		
Y	85	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	91	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
M	85	2	-	-	-	-	-	-	-	-	2	-	-	-	133	7	5	
	91	-	1	-	1	-	-	-	-	-	2	-	-	-	133	13	10	
	99	4	3	-	1	-	-	-	-	-	8	-	-	-	160	10	10	
D	85	2	1	-	-	-	-	-	-	-	3	-	-	-	200		3	
	91	1	-	2	-	-	1	-	-	-	2	-	-	2	266		4	
	99	-	4	-	-	-	-	-	-	-	3	-	-	1	80		4	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		17%			00%			00%			+14%							
'91		14%			43%			29%			-44%							
'99		54%			00%			08%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	399	Dec:	50%			
												'91	465		57%			
												'99	260		31%			

Trend Study 25A-19-99

Study site name: Row of Pines - Cattle Exclosure .

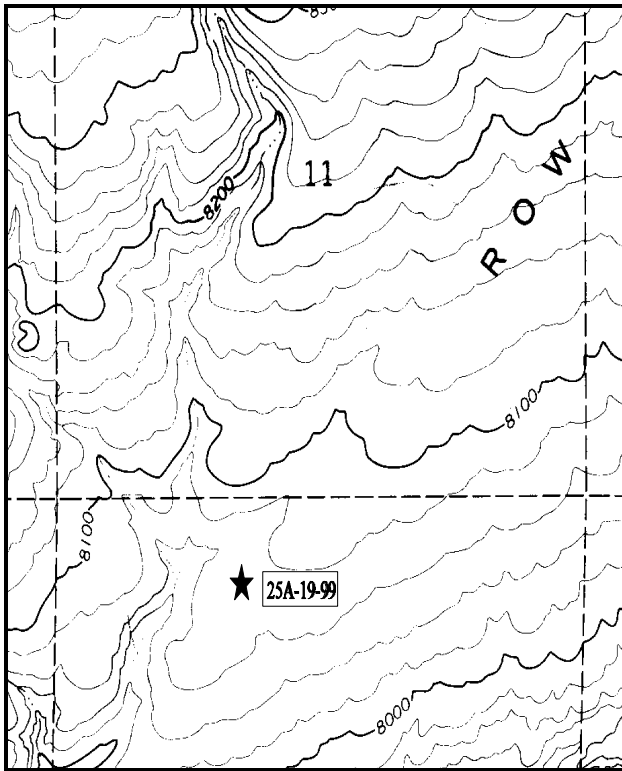
Range type: Sagebrush-Grass.

Compass bearing: frequency baseline 210°M.

Footmark (first frame placement) 5 feet, footmarks (frequency belts) line 1(11 and 95 ft), line 2(34 ft), line 3(59 ft), line 4(71ft).

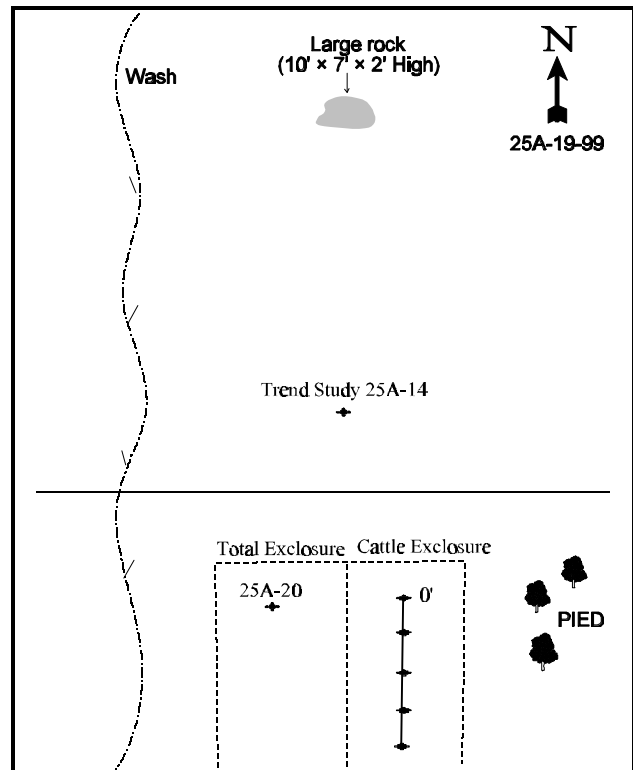
LOCATION DESCRIPTION

From the Chappell Cheese Factory northwest of Loa on SR 24, go west 2.6 miles to a side road on the north where the highway makes a sharp turn (0.95 miles west of mile marker #49). Take this road 0.65 miles and turn right after crossing a cattleguard. After 0.7 more miles, turn right at the fork and cross another cattleguard. Go 2.7 miles to another fork where you will again turn right. After ~60', turn right (east) and go 1.4 miles to an exclosure. The baseline runs down through the middle of the livestock exclosure (east side), with the 0 ft stake having browse tag #409 attached.



Map name: Loa, Utah

Township 27S, Range 2E, Section 14 .



Diagrammatic Sketch

UTM 4257898.994 N, 442713.387 E

DISCUSSION

Trend Study No. 25A-19

The Row of Pines Livestock Exclosure is a new trend study site established in 1999 inside the livestock exclosure. The exclosure was built in the late 1980's after the area was chained and seeded. A trend study (25A-14) was established in 1991 about 200 feet to the north of the exclosure. During the 1999 reading of the study outside of the exclosure, it was determined that data was needed within the livestock exclosure and the total exclosure. The area supports a sagebrush grass type which is nearly level (3-5% slope) and has a slight south aspect. Deer and elk use within the livestock exclosure was relatively heavy. Pellet group data estimated 48 deer and 58 elk days use/acre (119 ddu/ha and 143 edu/ha), most of which was winter use.

Soil depth is moderately shallow with an estimated effective rooting depth of just over 11 inches. Texture is a sandy clay loam to a loam with a neutral pH (7.0). Soil parent material is basalt. Phosphorus is marginal at 8.5 ppm. Values less than 10 ppm have been shown to limit normal plant growth and development. The soil surface is mostly a combination of pavement and bare ground with some evidence of soil erosion. Vegetation and litter cover are low at 22% and 12% respectively. However, due to the lack of slope, water erosion is not a major problem in this area.

The key browse species in this area is Wyoming big sagebrush which has an estimated density of 5,820 mostly mature plants/acre within the livestock exclosure. Utilization is moderate to heavy. Recruitment is poor with no seedlings and only 3% of the population consisting of young plants. Percent decadence is moderately high at 27% but more importantly, 63% of the decadent plants (980 plants/acre) appear to be dying. Even if only half of these plants actually die, there are only 160 young plants/acre to replace them. The only other common shrubs found in the exclosure are increasers, thinleaf low rabbitbrush and broom snakeweed with densities of 880 and 2,380 plants/acre respectively. Both populations are mostly mature and appear stable.

The herbaceous understory is dominated by grasses which are diverse for a Wyoming big sagebrush site. Common species include seeded crested wheatgrass and Russian wildrye, and native blue grama and bottlebrush squirreltail. Blue grama provides 37% of the grass cover while crested wheatgrass accounts for 26% of the grass cover and bottlebrush squirreltail provides another 19%. Other seeded grasses, intermediate wheatgrass and smooth brome, occur occasionally. Forbs are rare and produce less than one-half of 1% cover. The only fairly common species is low fleabane.

1999 APPARENT TREND ASSESSMENT

The soil trend appears stable due to abundant protective ground cover. However, rock and pavement provide most of this cover. Erosion is minimal due to the armored nature of the soil surface combined with the gentle terrain. Trend for the key browse, Wyoming big sagebrush, appears to be declining due to low recruitment combined with a high number of decadent dying plants. Utilization is moderate to heavy with most plants not currently producing seed. The increasers, thinleaf low rabbitbrush and broom snakeweed, appear to have mature and stable populations. The herbaceous understory is dominated by a variety of seeded and native grasses. The livestock exclosure contains more seeded grasses than outside. The low abundance of cool season perennial grasses outside of the exclosure and higher numbers of cool season grasses inside of the livestock exclosure indicates higher grazing pressure outside of the exclosure in the spring. Forbs are lacking here as well as outside of the exclosure.

HERBACEOUS TRENDS --
Herd unit 25A, Study no: 19

T y p e	Species	Nested Frequency '99	Quadrat Frequency '99	Average Cover % '99
G	Agropyron cristatum	130	52	2.66
G	Agropyron intermedium	1	1	.00
G	Bouteloua gracilis	91	37	3.86
G	Bromus inermis	10	3	.09
G	Elymus junceus	40	19	1.20
G	Oryzopsis hymenoides	10	6	.27
G	Sitanion hystrix	136	58	2.01
G	Stipa comata	1	1	.06
G	Stipa pinetorum	2	1	.15
Total for Annual Grasses		0	0	0
Total for Perennial Grasses		421	178	10.33
Total for Grasses		421	178	10.33
F	Androsace septentrionalis (a)	2	2	.01
F	Astragalus spp.	3	1	.00
F	Cryptantha spp.	3	2	.03
F	Eriogonum ovalifolium	1	1	.03
F	Erigeron pumilus	32	15	.15
F	Sphaeralcea coccinea	10	4	.04
F	Unknown forb-perennial	4	2	.03
Total for Annual Forbs		2	2	0.00
Total for Perennial Forbs		53	25	0.30
Total for Forbs		55	27	0.31

BROWSE TRENDS --
Herd unit 25A, Study no: 19

T y p e	Species	Strip Frequency '99	Average Cover % '99
B	Artemisia tridentata wyomingensis	91	8.23
B	Chrysothamnus viscidiflorus stenophyllus	28	.11
B	Gutierrezia sarothrae	67	1.06
B	Opuntia fragilis	6	.18
Total for Browse		192	9.59

BASIC COVER --

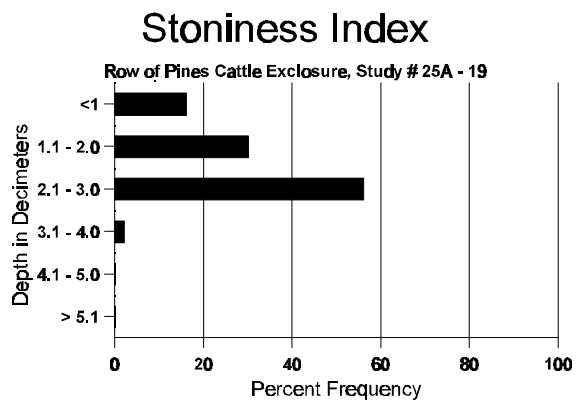
Herd unit 25A, Study no: 19

Cover Type	Nested Frequency '99	Average Cover % '99
Vegetation	305	21.47
Rock	278	12.68
Pavement	423	22.53
Litter	427	11.73
Cryptogams	5	.00
Bare Ground	420	22.28

SOIL ANALYSIS DATA --

Herd Unit 25A, Study # 19, Study Name: Row of Pines Cattle Exclosure

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
11.2	62.0 (12.3)	7.0	47.3	27.4	25.3	1.6	8.5	163.2	0.6



PELLET GROUP FREQUENCY --

Herd unit 25A, Study no: 19

Type	Quadrat Frequency '99	Pellet Transect Days Use/Acre (ha) '99
Rabbit	1	NA
Elk	24	87 (214)
Deer	22	71 (175)

BROWSE CHARACTERISTICS --

Herd unit 25A, Study no: 19

Field Unit 25A, Study No. 19																		
A Y G R E	Y	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Artemisia tridentata wyomingensis																		
Y	99	2	3	3	-	-	-	-	-	-	8	-	-	-	160		8	
M	99	6	112	87	-	-	-	-	-	-	203	-	-	2	4100	12 23	205	
D	99	1	29	36	3	-	9	-	-	-	29	-	-	49	1560		78	
X	99	-	-	-	-	-	-	-	-	-	-	-	-	-	940		47	
% Plants Showing '99		<u>Moderate Use</u> 49%			<u>Heavy Use</u> 46%			<u>Poor Vigor</u> 18%			<u>%Change</u>							
Total Plants/Acre (excluding Dead & Seedlings)														'99	5820	Dec:	27%	
Chrysothamnus viscidiflorus stenophyllus																		
Y	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
M	99	28	7	2	4	-	-	-	-	-	41	-	-	-	820	5 8	41	
D	99	1	1	-	-	-	-	-	-	-	-	-	-	2	40		2	
% Plants Showing '99		<u>Moderate Use</u> 18%			<u>Heavy Use</u> 05%			<u>Poor Vigor</u> 05%			<u>%Change</u>							
Total Plants/Acre (excluding Dead & Seedlings)														'99	880	Dec:	5%	
Gutierrezia sarothrae																		
S	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
Y	99	4	-	-	-	-	-	-	-	-	4	-	-	-	80		4	
M	99	115	-	-	-	-	-	-	-	-	115	-	-	-	2300	7 8	115	
X	99	-	-	-	-	-	-	-	-	-	-	-	-	-	80		4	
% Plants Showing '99		<u>Moderate Use</u> 00%			<u>Heavy Use</u> 00%			<u>Poor Vigor</u> 00%			<u>%Change</u>							
Total Plants/Acre (excluding Dead & Seedlings)														'99	2380	Dec:	-	
Opuntia fragilis																		
M	99	10	-	-	-	-	-	-	-	-	10	-	-	-	200	2 5	10	
% Plants Showing '99		<u>Moderate Use</u> 00%			<u>Heavy Use</u> 00%			<u>Poor Vigor</u> 00%			<u>%Change</u>							
Total Plants/Acre (excluding Dead & Seedlings)														'99	200	Dec:	-	

Trend Study 25A-20-99

Study site name: Row of Pines - Total Exclosure .

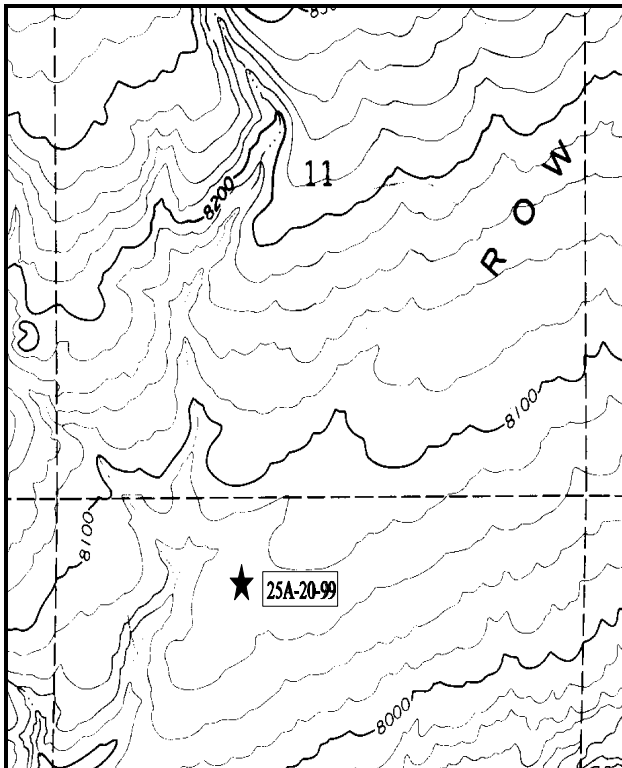
Range type: Sagebrush-Grass .

Compass bearing: frequency baseline 205°M.

Footmark (first frame placement) 5 feet, footmarks (frequency belts) line 1(11 and 95 ft), line 2(34 ft), line 3(59 ft), line 4(71ft).

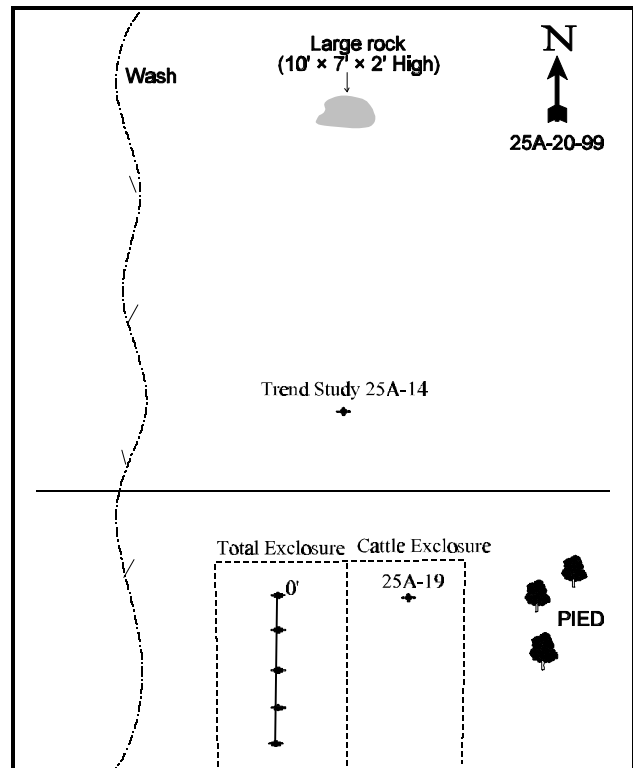
LOCATION DESCRIPTION

From the Chappell Cheese Factory northwest of Loa on SR 24, go west 2.6 miles to a side road on the north where the highway makes a sharp turn (0.95 miles west of mile marker #49). Take this road 0.65 miles and turn right after crossing a cattleguard. After 0.7 more miles, turn right at the fork and cross another cattleguard. Go 2.7 miles to another fork where you will again turn right. After ~60', turn right (east) and go 1.4 miles to an exclosure. The baseline runs down through the middle of the total exclosure (west side), with the 0 ft stake having browse tag #410 attached.



Map name: Loa, Utah

Township 27S, Range 2E, Section 14 .



Diagrammatic Sketch

UTM 4257938.767 N, 442657.546 E

DISCUSSION

Trend Study No. 25A-20

The Row of Pines Total Exclosure is a new trend study site established in 1999 within the total exclosure. The exclosure was built in the late 1980's after the area was chained and seeded. A trend study (25A-14) was established in 1991 about 200 feet to the north of the exclosure. During the 1999 reading of this study site, it was determined that data was needed within both the livestock exclosure and the total exclosure. The area supports a sagebrush grass type which is nearly level (3-5% slope) and has a slight south aspect. The general area is used by deer and elk in the winter and early spring, and by cattle in the spring and summer. One old cattle pat was encountered within the total exclosure but the fences appear to be in good repair now.

Soil conditions in the total exclosure are nearly identical to that of the livestock exclosure and outside. Soil depth is moderately shallow with an estimated effective rooting depth of just over 11 inches. Texture is a sandy clay loam to a loam with a neutral pH (7.0). Soil parent material is basalt. Phosphorus is marginal at 8.5 ppm. Values less than 10 ppm have been shown to limit normal plant growth and development. The soil surface is mostly a combination of pavement and bare ground with some evidence of soil erosion. Vegetation cover is moderate at 28% and litter cover is low at just 11%. However, due to the lack of slope, water erosion is not a major problem in this area.

The key browse is Wyoming big sagebrush which has a density of 6,160 plants/acre. Conditions here, within the total exclosure, are very similar to the livestock exclosure. The population is mostly mature with a moderate decadency rate of 27%. However, 65% of the decadent plants (1,080 plants/acre) appear to be dying. No seedlings were encountered and young recruitment is low with just 320 young plants/acre estimated. Since the sagebrush is not utilized within the total exclosure, this decadence must be caused by drought or winter injury, or a combination of both. Density of the increaser, thinleaf low rabbitbrush is similar to the livestock exclosure at 900 plants/acre. However, broom snakeweed density is over 2½ times higher at 6,320 plants/acre. Most of the population consist of mature plants but 4% are young.

The total exclosure supports a similar perennial grass understory as the livestock exclosure. Seeded crested wheatgrass and Russian wildrye provide 58% of the grass cover. Bottlebrush squirreltail is the most abundant native grass. The warm season blue grama is not as abundant here as it is in the livestock exclosure. It only produces 12% of the grass cover. Forbs are rare and less diverse in the total exclosure. Low fleabane accounts for 98% of the forb cover.

1999 APPARENT TREND ASSESSMENT

Soil conditions are very similar to the livestock exclosure and outside of the exclosure. Vegetation and litter cover are low and most of the protective ground cover comes from rock and pavement. Erosion is minimal due to the armored nature of the soil surface. The browse trend appears to be declining, similar to the livestock exclosure. There is no use here but recruitment is still low, vigor poor, percent decadence moderate, and a large proportion of the decadent plants appear to be dying. Another negative aspect is the large population of the increaser, broom snakeweed, which is more abundant here compared to the livestock exclosure. The herbaceous understory is similar to the livestock exclosure but grasses produce slightly less cover. Forbs are rare and dominated by low fleabane which provides 98% of the forb cover.

HERBACEOUS TRENDS --

Herd unit 25A, Study no: 20

T y p e	Species	Nested Frequency '99	Quadrat Frequency '99	Average Cover % '99
G	Agropyron cristatum	99	40	2.69
G	Agropyron intermedium	2	1	.00
G	Bouteloua gracilis	49	21	1.08
G	Bromus inermis	4	3	.05
G	Elymus junceus	63	23	2.51
G	Oryzopsis hymenoides	18	7	.62
G	Sitanion hystrix	125	50	2.01
Total for Annual Grasses		0	0	0
Total for Perennial Grasses		360	145	8.99
Total for Grasses		360	145	8.99
F	Androsace septentrionalis (a)	5	2	.01
F	Castilleja spp.	3	1	.00
F	Erigeron pumilus	54	24	.92
F	Sphaeralcea coccinea	10	3	.02
Total for Annual Forbs		5	2	0.00
Total for Perennial Forbs		67	28	0.94
Total for Forbs		72	30	0.95

BROWSE TRENDS --

Herd unit 25A, Study no: 20

T y p e	Species	Strip Frequency '99	Average Cover % '99
B	Artemisia tridentata wyomingensis	91	13.97
B	Chrysothamnus viscidiflorus stenophyllus	25	.25
B	Gutierrezia sarothrae	85	3.00
	Opuntia fragilisb	2	-
Total for Browse		203	17.23

BASIC COVER --

Herd unit 25A, Study no: 20

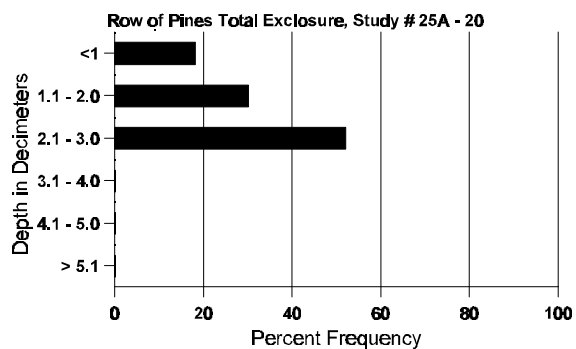
Cover Type	Nested Frequency '99	Average Cover % '99
Vegetation	298	28.20
Rock	302	9.11
Pavement	435	31.69
Litter	374	10.99
Bare Ground	402	20.04

SOIL ANALYSIS DATA --

Herd Unit 25A, Study # 20, Study Name: Row of Pines Total Exclosure

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
11.1	60.8 (11.6)	7.0	47.3	27.4	25.3	1.6	8.5	163.2	0.6

Stoniness Index



PELLET GROUP FREQUENCY --

Herd unit 25A, Study no: 20

Type	Quadrat Frequency '99
Cattle	1

BROWSE CHARACTERISTICS --

Herd unit 25A, Study no: 20

Field unit 23A, Study No. 20																			
A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total	
		1	2	3	4	5	6	7	8	9	1	2	3	4					
Artemisia tridentata wyomingensis																			
Y	99	16	-	-	-	-	-	-	-	-	16	-	-	-	320			16	
M	99	209	-	-	-	-	-	-	-	-	206	-	-	3	4180	11	21	209	
D	99	83	-	-	-	-	-	-	-	-	29	-	-	54	1660			83	
X	99	-	-	-	-	-	-	-	-	-	-	-	-	-	620			31	
% Plants Showing '99 <u>Moderate Use</u> <u>Heavy Use</u> <u>Poor Vigor</u> <u>%Change</u> 00% 00% 19%																			
Total Plants/Acre (excluding Dead & Seedlings)															'99	6160	Dec:	27%	
Chrysothamnus viscidiflorus stenophyllus																			
M	99	34	-	-	3	-	-	-	-	-	36	-	1	-	740	4	7	37	
D	99	8	-	-	-	-	-	-	-	-	-	-	-	8	160			8	
% Plants Showing '99 <u>Moderate Use</u> <u>Heavy Use</u> <u>Poor Vigor</u> <u>%Change</u> 00% 00% 20%																			
Total Plants/Acre (excluding Dead & Seedlings)															'99	900	Dec:	18%	
Gutierrezia sarothrae																			
Y	99	12	-	-	-	-	-	-	-	-	12	-	-	-	240			12	
M	99	302	-	-	-	-	-	-	-	-	299	-	1	2	6040	7	9	302	
D	99	2	-	-	-	-	-	-	-	-	-	-	-	2	40			2	
X	99	-	-	-	-	-	-	-	-	-	-	-	-	-	260			13	
% Plants Showing '99 <u>Moderate Use</u> <u>Heavy Use</u> <u>Poor Vigor</u> <u>%Change</u> 00% 00% 02%																			
Total Plants/Acre (excluding Dead & Seedlings)															'99	6320	Dec:	1%	
Opuntia fragilis																			
Y	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1	
M	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20	-	-	1	
% Plants Showing '99 <u>Moderate Use</u> <u>Heavy Use</u> <u>Poor Vigor</u> <u>%Change</u> 00% 00% 00%																			
Total Plants/Acre (excluding Dead & Seedlings)															'99	40	Dec:	-	

ROW OF PINES EXCLOSURE COMPARISON SUMMARY

Total Exclosure 25A-20, Livestock Exclosure 25A-19, and Outside 25A-14

1999 Comparisons

Ground cover characteristics are similar between sites in that vegetation and litter cover are low and most of the ground cover is made up of rock and pavement. The total exclosure has the most vegetation cover at 28.2%, while outside has 26% and the livestock exclosure produces 22%. Litter cover is highest outside of the exclosure at 18%, with the livestock and total exclosures containing 12% and 11% respectively. Rock and pavement cover account for 43% cover outside of the exclosure, the livestock exclosure has 35%, and the total exclosure 41%. Percent bare ground is very similar ranging from 20% in the total exclosure to 22% in the livestock exclosure.

Due to the study sites close proximity, soil conditions are nearly identical. The soil is moderately shallow with effective rooting depths at just over 11 inches. Soil texture is a sandy clay loam to a loam with an identical neutral pH (7.0). Phosphorus is marginal on all sites at 8.5 ppm. Values less than 10 ppm have been shown to limit normal plant growth and development. Soil temperatures are lower outside of the exclosure at 55.4°F, compared to 62°F in the livestock exclosure and 60.8°F in the total exclosure. There is minimal soil movement occurring but the armored nature of the soil surface limits erosion.

Wyoming big sagebrush shows similar trends on all sites. Population densities are similar ranging from 5,580 plants/acre outside to 5,820 plants/acre in the livestock exclosure, and 6,160 in the total exclosure. Utilization was moderate outside of the exclosure and much heavier in the livestock exclosure. Pellet group data estimates 29 deer, 15 elk and 15 cow days use/acre (72 ddu/ha, 37 edu/ha, 37 cdu/ha) outside of the exclosure and 48 deer and 58 elk days use/acre (118 ddu/ha, 143 edu/ha) in the livestock exclosure. All populations of sagebrush are mostly mature and percent decadence is moderate, ranging from 29% outside to 27% in the livestock and total exclosures. All sites also show high proportions of dying decadent plants which range from 47% outside to 63% in the livestock exclosure and 65% in the total exclosure. Seed production and recruitment is poor on all sites and young plants are not abundant enough to maintain the current populations. Since sagebrush in the total exclosure has not been utilized, the poor condition and health must be the result of drought and/or winter injury. It appears that the sagebrush populations will decline on all sites with the highest mortality being in the total exclosure, then the livestock exclosure. These stands may not decline if recruitment improves in the next few years.

Density of the increaser, thinleaf low rabbitbrush, is similar between sites ranging from 880 plants/acre in the livestock exclosure to 1,100 outside. Another increaser, broom snakeweed, is extremely abundant outside of the exclosure at 10,000 plants/acre. This population is mostly mature but young plants account for 10% of the population and it has a biotic potential (# of seedlings) of 5%. This would suggest a slowly expanding population. Density of broom snakeweed is also high in the total exclosure at 6,320 plants/acre but nearly all of these are mature (96%). The lowest density is in the livestock exclosure which has an estimated 2,380 plants/acre. This stand is also nearly all mature (97%).

The herbaceous understories are similar on all sites with respect to species present but composition differs. Outside of the exclosure, blue grama dominates the grass composition by providing 73% of the grass cover. The only other common grass is bottlebrush squirreltail which adds an additional 20% of the grass cover. All other grasses occur occasionally. Forbs are rare and consist mostly of low fleabane which accounts for 59% of the meager forb cover. Compositions are similar in the livestock and total exclosures. Seeded grasses, crested wheatgrass and Russian wildrye occur only occasionally outside of the exclosure, but they are much more abundant in the livestock and total exclosures where they provide 38% and 58% of the grass cover respectively. Native grasses, blue grama, and bottlebrush squirreltail are also abundant within the exclosures. Bottlebrush squirreltail occurs at similar frequency in both exclosures but blue grama is more abundant in the livestock exclosure where it provides 37% of the grass cover compared to 12% in the total exclosure. Both exclosures contain few forbs.

SUMMARY

WILDLIFE MANAGEMENT UNIT 25A (44) - PLATEAU, FISH LAKE

Twelve trend study sites on the Fish Lake Unit were originally established in 1985. These were reread in 1991 and an additional 3 summer or transitional sites were established. All 15 sites were reread in 1999 and two new sites were established within the Row of Pines Exclosure. Overall, the trend study sites show a lack of forbs. The only sites with a moderately high proportion of forbs in the understory occur at East Tidwell (#25A-12) a high elevation summer range site, and Ox Spring (#25A-13) which samples a prescribed burn. Both of these sites currently display a downward trend with respect to forbs. Forb cover for the other 13 trend study sites averages only 1.7% . Seven of these sites show declining trends for forbs while the other 6 are stable.

Of the 10 winter range sites on the Fish Lake unit, three sites, Triangle Mountain (#25A-1) and Black Mountain (#25A-2), and Durfee Homestead (#25A-4) monitor pinyon-juniper chainings on deer and elk winter range. The trend study at Lower Dog Flat (#25A-8) samples a chaining on mountain big sagebrush. The Triangle and Black Mountain studies have little browse on site.

Other winter range sites which sample mostly sagebrush include; Sage Flat (#25A-3), Praetor Slope (#25A-5), Row of Pines (#25A-9), Cedarless Flat (#25A-10), Forsyth Reservoir (#25A-11), and Tommy Hollow (#25A-16). The trend study at Evans Reservoir (#25A-7) samples primarily pronghorn range but it is also used by deer and elk in the winter.

Four trend study sites sample deer and elk summer and/or transitional range on the Fish Lake unit. These include; East Tidwell (#25A-12), Ox Spring (#25A-13), Row of Pines Exclosure (#25A-14), and Elk Camp (#25A-18).

TREND SUMMARY

Site	Category	1994	1999
25A-1 Triangle Mountain	soil	+	0
	browse	+	0
	herbaceous understory	+	0
25A-2 Black Mountain	soil	-	0
	browse	-	0
	herbaceous understory	+	0
25A-3 Sage Flat	soil	0	0
	browse	+	0
	herbaceous understory	-	-
25A-4 Durfee Homestead	soil	-	0/+
	browse	-	-
	herbaceous understory	-	0

Site	Category	1994	1999
25A-5 Praetor Slope	soil	0/-	0
	browse	-	0
	herbaceous understory	0	0
25A-7 Evans Reservoir	soil	-	0/+
	browse	-	-
	herbaceous understory	+	-
25A-8 Lower Dog Flat	soil	0	0
	browse	0	0
	herbaceous understory	0	0
25A-9 Row of Pines	soil	-	+
	browse	-	-
	herbaceous understory	0	+
25A-10 Cedarless Flat	soil	0	0
	browse	+	0
	herbaceous understory	+	-
25A-11 Forsyth Reservoir	soil	0	0
	browse	+	0
	herbaceous understory	0	-
25A-12 East Tidwell	soil	est	0
	browse	est	0
	herbaceous understory	est	-
25A-13 Ox Spring	soil	est	0
	browse	est	+
	herbaceous understory	est	-
25A-14 Row of Pines Exclosure	soil	est	0/+
	browse	est	-
	herbaceous understory	est	+
25A-16 Tommy Hollow	soil	0/+	0/+
	browse	-	+
	herbaceous understory	0	-

Site	Category	1994	1999
25A-18 Elk Camp	soil	-	0/+
	browse	-	+
	herbaceous understory	0	0
25A-19 Row of Pines Livestock Exclosure	soil		est
	browse		est
	herbaceous understory		est
25A-20 Row of Pines Total Exclosure	soil		est
	browse		est
	herbaceous understory		est

(-) = downward, (+) = upward, (0) = stable, (0/+) = stable to slightly upward, (0/-) = stable to slightly declining, (est) = trend study established